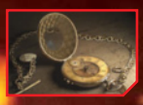

6 TEXTURING TIPS

Add wear and tear to your renders with these key antique tips for Maya

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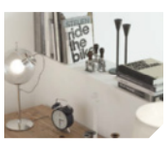

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> You create shapes in a 3D space that react to light, so you can destroy your hard work with bad lighting or even enhance it by making smart decisions

Maarten Verhoeven on the important of lighting **Page 26**

Maarten Verhoeven
verhoevenmaarten.blogspot.co.uk

Software ZBrush, KeyShot

Master lighting Page 22

Make your renders look like photographs **Page 46**

Welcome

To the magazine and 100 pages of amazing 3D

Welcome to **3D Artist**! Lighting is such a crucial part of the pipeline, and yet it's such an easy thing to get wrong when developing a 3D scene. In response to this, we've pulled together a comprehensive guide to lighting that is guaranteed to get you treating your scenes with the same finesse that the pros do on a daily basis, with workflow tips and theoretical musings from people like Ian Spriggs, Maarten Verhoeven and more.

Also in the issue this month is a smorgasbord of wonderful tutorials, including Maya concept car techniques, tips for making your renders look indistinguishable from photographs, an abstract masterclass in Blender, awesome Houdini explosions, a look at the 3ds Max 2016 Max Creation Graph, ZBrush Fibermesh hair pointers and an antique texturing lesson. Plus, we've gathered a slew of fantastic arch-vis practioners and asked them to provide 20 style secrets for you to employ in your work.

Check out The Hub for an awesome 3D printing filament competition from Verbatim, as well as a look at how Elastic VFX created the stunning opening titles for Marvel's Daredevil. Plus, as usual, we've brought you a tone of free resources to download from FileSilo, including models, textures and videos. Enjoy!

Steve Holmes, Deputy Editor

Sign up, share your art and chat to other artists at **www.3dartistonline.com**

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3D Artist

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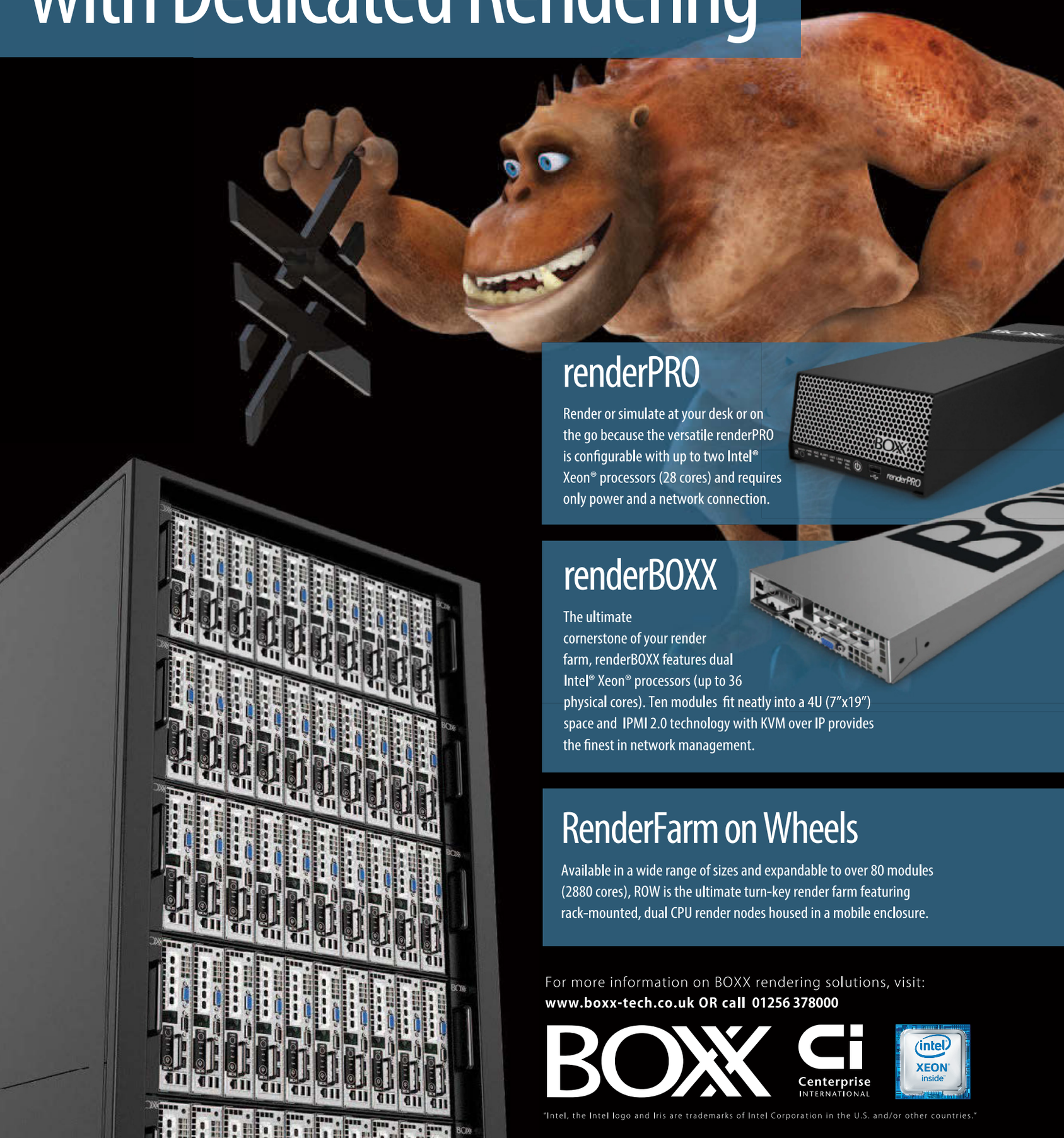

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The Expert Panel

This issue's team of pro artists...

IGOR SOBOLEVSKY
artstation.com/artist/igoq

Join Igor over on p38 as he walks you through the interesting process of designing futuristic concept cars in Maya, Rhino3D and more. The end result is absolutely stunning!
3DArtist username igoq

DUŠAN KOVIĆ
artstation.com/artist/dusankovic

From time to time you'll see a render that is completely indistinguishable from a photograph and wonder how the artist has done it. Wonder no more – Dušan reveals all on p46.
3DArtist username dusan.kovic

REYNANTE MARTINEZ
reynantemartinez.com

Reynante produces enough incredible art in Blender to have his own magazine, really. This month he's here to show you how to create unique, abstract designs with the free software.
3DArtist username reynantem

CARLOS PARMENTIER
carlosparmentier.com

Many of you will have seen Carlos's pyro simulation on Vimeo a few months ago. It was so good we had to find out how he did it, so head to p62 and learn how to create Houdini explosions of your own.
3DArtist username n/a

PAUL HATTON
cadesignservices.co.uk

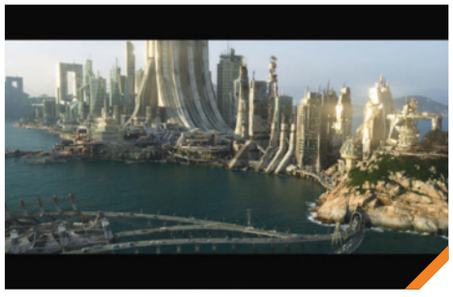
This month we've asked Paul to dive into 3ds Max to highlight some of the cool new features of the Max Creation Graph, with arch vis as the centrepiece. His tutorial is over on p66.
3DArtist username phatton

DANIEL ORIVE
danielorive.com

Daniel has taken some time out from making videogames to teach you how to use FiberMesh in ZBrush to create nonphotorealistic hairstyles. Head over to p70 to check it out.
3DArtist username n/a

TASHINA VAN ZWAM
framecandy.nl

We fell in love with Tashina's pocket watch render as soon as we saw it, but how did she create such believable antique textures? Visit her over on p72 to find out how she did it.
3DArtist username Tashina



PAUL CHAMPION
linkedin.com/in/pchampion

The master of NUKE, Paul Champion, spends this month tinkering with the new V-Ray for NUKE plugin and analyses how well it fits into a compositor's workflow. Check out his verdict on p80.
3DArtist username Rocker

ORESTIS BASTOUNIS
twitter.com/mrbastounis

Steve was nice to Orestis this month and sent him a workstation that's absolutely tiny compared to the ones we usually get in – he could actually find space for it in his house for once.
3DArtist username n/a

ZBRUSH 4R7®

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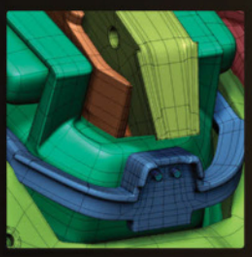
With ZBrush 4R7 and its new ZModeler Brush you can use the same techniques as artist Cki Vang to go from concept to hard surface model, quickly producing richly detailed, high quality 3D models. And thanks to the non-linear workflow that ZBrush is famous for, he always has flexibility to change his mind or try new ideas throughout the creation process.

VISIT CKI VANG'S WEBSITE: VANGCKI.COM

DYNAMESH

The perfect way to explore the concept for a new model in just a few minutes.



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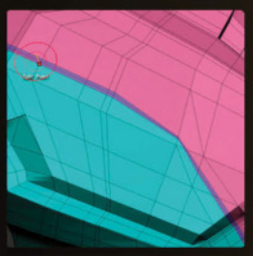
Quickly build clean shapes and refine the model's topology.



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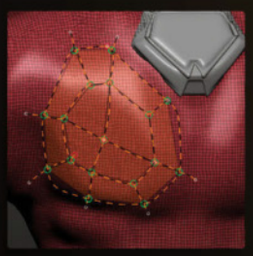
Easily cut your model into sections before adding more details.



TOPOLOGY BRUSH

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Let There be Light

"For some small details I like to add some extra shapes to create an extra rim or highlight"
Maarten Verhoeven on tweaking his lighting setups **Page 26**

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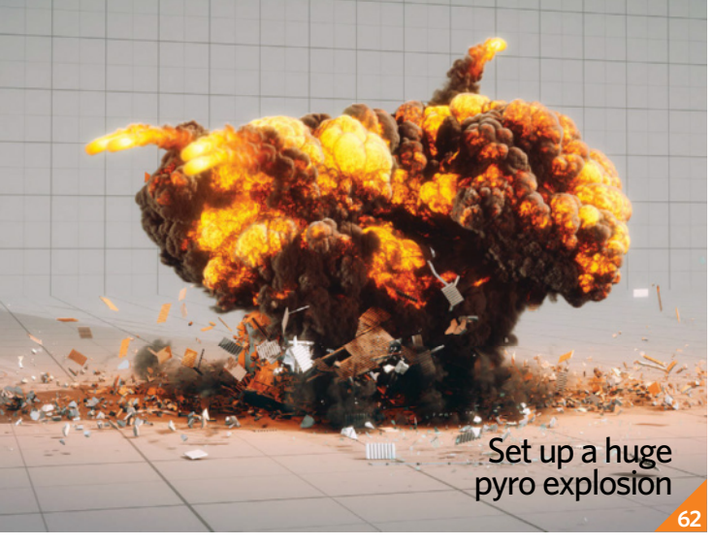

“Always keep your edge count in mind. An equal number of edges makes for easy geometry bridging”
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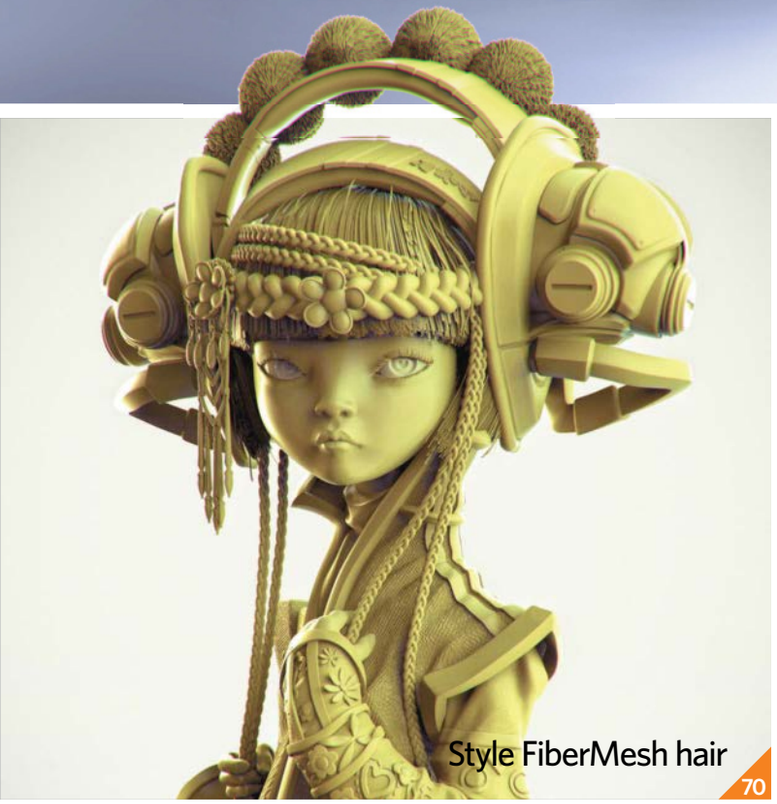

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The Gallery

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Mahmoud Amghar

virtuald.magix.net/page-d-accueil

Freelance 3D artist and administrative officer

Software 3ds Max, V-Ray, ZBrush, Photoshop, PhotoImpact

Work in progress...

“The image is about an abandoned treasure in a cellar. This treasure is monitored by a four-legged dragon, while the scattered skulls show that previous treasure hunters have lost their lives”

Mahmoud Amghar, *Your life or life,* 2015

“With this creature I wanted to start a little series of characters for developing my personal style and workflow. Cocohell was a personal challenge for me but very funny to create. It was great to develop all of its details”

Diego Sain, *Cocohell,* 2015

Diego Sain
iusalab.com

3DArtistOnline username: DiegoSain

Software ZBrush, Maya, KeyShot, Photoshop

Work in progress...

> Realism is something I always find myself drawn to in my projects. Looking for an idea for a new one, I saw a music video online with a similar setting and was inspired by the lighting and atmosphere. Sculpting being something I wanted to improve, I decided to give it a try in 3D
>
> **Simon Thommes,** *Out for a Waltz,* 2015

Simon Thommes
info.simon-thommes.com

3DArtistOnline username:
pixelshatter

Software Blender, Photoshop

Work in progress...

"The initial model was blocked out in ZBrush using DynaMesh, boxes and spheres. I then further developed the design by painting over a ZBrush render in Photoshop"

Matt Corcoran, *Warrior,* 2015

Matt Corcoran
swordofhonor.com

Matt is a professional artist. He has worked with companies like ILM, Hasbro and Outpost

Software ZBrush, 3ds Max and KeyShot

Work in progress...

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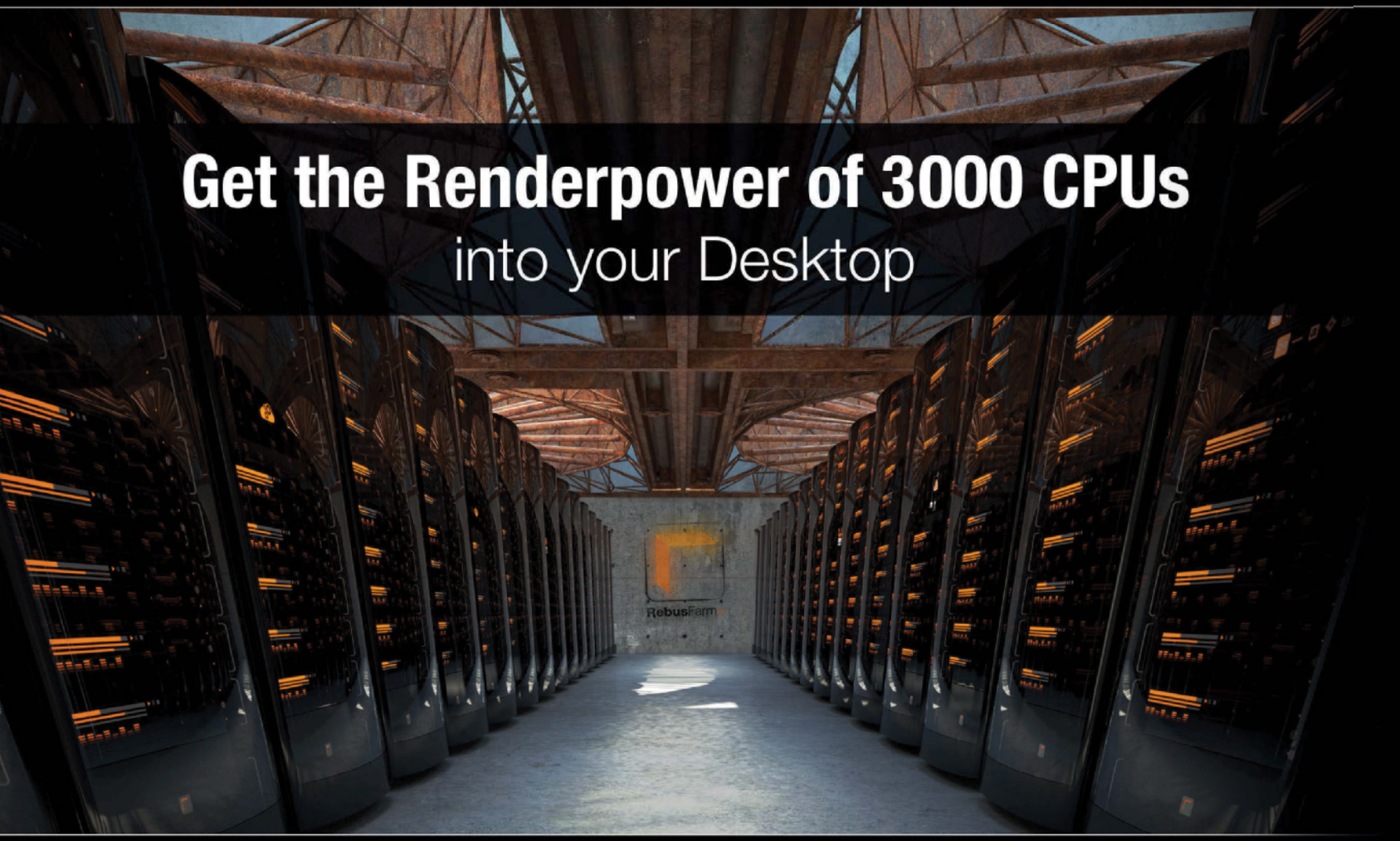

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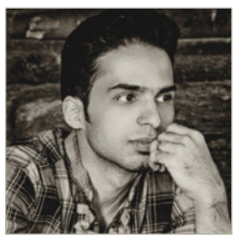


Peyman Mokaram
peymanmokaram.com

3DArtistOnline username:
hit-fx

Software Maya, ZBrush, MARI, Photoshop, NUKE

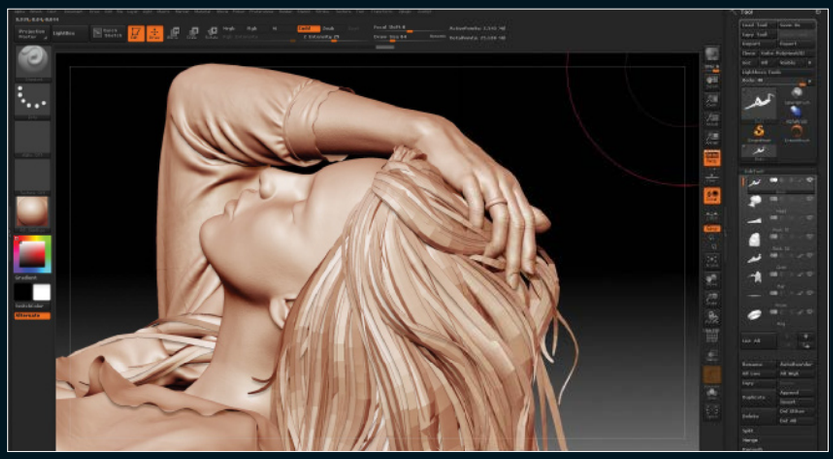
Work in progress...

"I decided after several years to choose to work on a project that has many challenges for a personal project, and so Eleanor was created"

Peyman Mokaram, *Eleanor,* 2015

> The reason for choosing to render Eleanor was due to the challenges of the project such as anatomy, hair, clothing, as well as environment

Peyman Mokaram, *Eleanor,* 2015



CONCEPT
LEFT I have a different feel with this than previous works because this project was completed whilst I was in a certain situation (relationship) which I undoubtedly will never forget. I hoped this work would be so strong that the feeling would be passed on.

THE TOOLS OF THE TRADE
RIGHT I used Maya for the base model, and I made a base mesh of cloth in Marvelous Designer. All of the details have been made in ZBrush. The textures were done in ZBrush and MARI, and other textures were fixed in Photoshop. The lighting and rendering was done in Maya with V-Ray. Hair was done with Maya, and the composite layer and final output were done in Photoshop!

RENDER LAYER
RIGHT
For this object I split the image into two main sections of the front and rear objects. Each part includes a breakdown of the main light, GI, material ID, reflective, refract, SSS, spec and other layers. With these render layer images, we can achieve a good composite.

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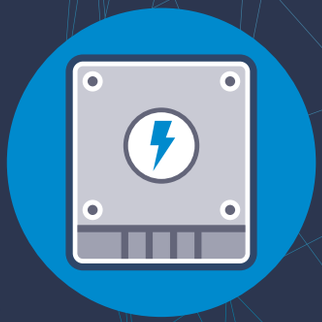

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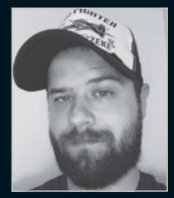
ENVIRONMENT DESIGN For Sci-fi Corridor, I wanted to shift from wide, open vista shots to intimate interiors and living spaces for a change. It's a nice challenge for me to get into the details and think about the deep construction of environments.



Elijah McNeal
el1j4h.artstation.com

Elijah is a concept artist working in the videogame and film industry on titles like *Star Citizen*

Software 3ds Max, ZBrush

Sci-fi Corridor, 2015

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LET THERE BE LIGHT

Light is an elusive, powerful thing. Five experts reveal the techniques they use to master illumination

You spend hours, weeks, even months on a model, so don't make the mistake of rushing the lighting job – thinking that the quality of the 3D means that the decoration of it won't matter. Not only will you be failing to show your work off in the best possible way, but you'll also be missing the opportunities that light can bring to further set the mood, define your character and tell your story. In short, as Dieter Coetzee puts it, "Lighting can make or break any art piece."

All of which is why professionals dedicate a serious amount of time to the lighting phase (or work with artists who specialise in it). Reynante Martinez says: "I usually divide the labour on a project into four primary aspects: modelling, texturing, lighting, and compositing, each having 25 per cent of the time and effort I invest. I don't do it chronologically but instead, I perform lighting whenever I see the need to and to further get the feel of my scene, even if there are no textures and detailed models yet."

For Coetzee, the "biggest challenge is to make a character stand out from the background, and at the same time make it fit in." Although, sometimes, you really do want your character to jump out. As Maarten Verhoeven explains when talking about his piece, Dirt Devil (pg 23), "I wanted to create a scare moment, something that pops up in your face. You look in a dark room and this pops up. I've added some sparks in post just [for the feel of] a nearby fire or a torch."

And light really has the power to do all that. "If the light comes from the bottom of the character," says Coetzee, "the character tends to look much more evil and sinister. Lighting from above however, will make the character look more powerful and strong. Regarding colour, the hue of your light can affect the mood of your image drastically."

Flavia Minnone agrees: "The framing, colour and the light's position in the scene defines the reading key of our image. Through the light's colour choice we can transmit different feelings. Red can be passion or drama, blue can relate to stillness or sadness, green to nature or fantasy atmosphere, vibrant yellow to happiness, while desaturated yellow can [be] desolation. The light coming from the bottom transmits drama or fear, the light from the back transmits contrast and mystery, while diffuse light transmits calm or a sense of distance."

Lighting has some tried-and-tested techniques, which our experts detail over the following pages. Follow these methods, but leave room for experimentation and that rough-around-the-edgedness that gives the piece life. As Martinez explains, "When reviewing images and/or checking [a] beginner's renders, I always notice scenes which are evenly lit. Another cliché I usually encounter is forcing the three-point lighting where it's not applicable. It's best to start off simple with your lighting, one lamp at a time and adding more as you need them..."

Interviewees

Dieter Coetzee
Triggerfish Animation Studios / Flying Circus
Key projects: **'Burgeon', *Jungle Beat* Season 3, *Jungle Beat Explorers*, *Stick Man***
dieter.artstation.com

Reynante Martinez
Freelance
Key projects: **Empty, Stigma, Distant Worlds**
reynantemartinez.com

Flavia Minnone
Jellyfish Pictures
Key projects: **'Mila', *Floogals***
behance.net/flaviaminnone

Ian Spriggs
Freelance
Key projects: ***Warcraft*, *Crimson Peak***
ianspriggs.com

Maarten Verhoeven
Freelance
Key projects: **Hasbro, Gentle Giant, The Gnomon Workshop DVD**
verhoevenmaarten.blogspot.co.uk

"The three things I normally manipulate to create a certain mood are light direction, light colour and light intensity," explains Coetzee

MASTER THREE-POINT LIGHTING *with Dieter Coetzee*

Three-point lighting is the technique used to illuminate characters and control the shadows that a single direct light source would create. But just because it's a commonly used technique doesn't mean it can't be a powerful – or a subtle – one. Dieter Coetzee says he regularly uses three-point lighting. "It is a good way to display your character's form and it makes it feel more three dimensional," he says. "It is easy to use and can be manipulated to set any mood and improve your character's personality and story."

Coetzee says he always uses a lot of layers when he lights, and composites in Photoshop for a still image or NUKE for an animation sequence. Sometimes, he says he "gets so caught up lighting one layer, when I render all of them out it will look like a jumble of different images instead of one, singular art piece. The way to prevent this from happening is to have a key light that is your main light and all the layers will share this one particular light. When tweaking this light for a certain layer, it will update all of them and it will help keep continuity." In Mother Nature is Cruel (seen above), Coetzee used all three lights; key, fill and rim light. But, he adds, "You don't always have to use all three, as it all depends on what you want the viewer to feel and think after looking at your artwork."

The key light

"The key light is your main light. In my example it is the Sun. It normally comes from one angle so the opposing side of your character is in shadow. This gives it a more varied, interesting look. Out of the three lights, this is normally the brightest. This will usually be your main focal point and keep in mind that it may influence your texture and shader colours. I made mine a yellow/orange colour to represent the Sun."

The fill light

"The fill light is used to brighten up the other half of your character that is in shadow. It is positioned on the opposite side of the character where the key light doesn't reach. The fill light has a lower intensity than the key light , as you don't want to take attention away from your main focus. I usually make the brightness of my fill light at least a quarter of the key light's. The fill light lights a darker area, so I give it more colour to make the shadows look intriguing."

The rim light

"The rim light is placed behind the character and creates highlights around the outline of the character. The purpose of this light is to separate your character from the background and, yet again, draw your eye to the main focal point. You should generally make this light's intensity slightly more than the key light, because you want those highlights around your character to be visible."

"I always light my character's eyes on a separate layer," explains Coetzee

LIGHT INTERIOR SCENES *with Reynante Martinez*

Reynante Martinez planned to create a grim atmosphere for one of his latest pieces, entitled Gone (seen on the right). He knew that lighting would be one of the key challenges for it, and that it being an interior meant there could be issues with noise.

"Lighting is one of the most exciting aspects of creating an artwork," says Martinez, "but it is also one that can be very frustrating. One of the challenges faced when doing the lighting phase is making sure that there is a unified balance between light and darkness, so much like the chiaroscuro concept. Often, we are tempted to illuminate everything in the scene, but then this will make it look too bland, so adding a few shadows and contrasting areas will add more depth. Another challenge is choosing the right amount of light intensity combined with shadow softness, not to mention the colour combinations that will be used."

Colour combinations create drama in images. Also, he says, "take into consideration the shadows that your lights create, they're equally as important as the brighter parts of your render. Another thing to take note of is that, relatively, the larger the light source the softer the shadows become."

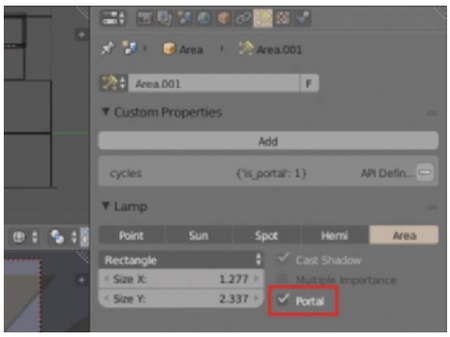
And while Martinez is a keen user of Blender and render engine Cycles, sometimes great lighting is simply about stepping back and studying light. "Step back from your computer," he says, "go out and study light – how thin leaves behave when struck with light beams, how your glass of water produces caustics, – all these are essential components into having a better idea of how lighting works. And always keep it simple."

HDR options

"I started off by utilisng IBL (image-based lighting) techniques via Cycles. To do this, I used an HDR image of a forest which has some nice colour variations. By doing this first, I can get a sense of where to place my succeeding lights and will give me a better feel of what my scene will look like."

Bring the Sun

"Now that I have some nice colour illumination on my scene, I start adding in a Sun lamp with a relatively larger size to cast softer shadows. I also add a slight tint of yellow to give it a more captivating look."

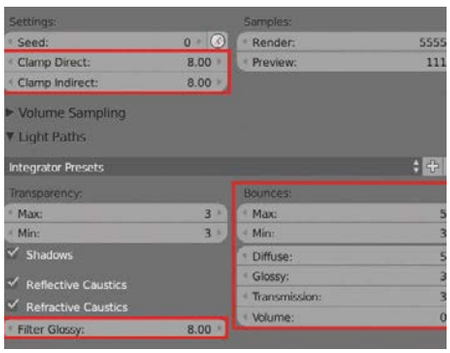


Use a portal

"By default, these lighting setups will create a relatively noisy render since the ray tracer is having a hard time figuring out what rays to calculate, especially on the darker parts of the image. Thankfully, there was a new feature added to Cycles – portals. This feature utilises the area lamp and tells Cycles to concentrate its rays in the direction of the portal, thus reducing unnecessary light bounces and calculations."

Clamp down

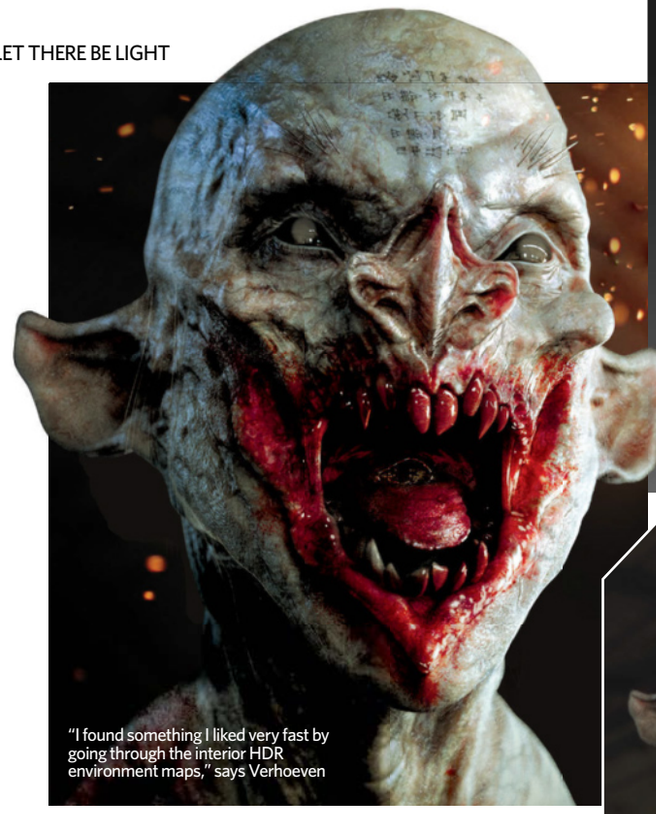
"Then, to reduce noise and rendering artefacts, I utilised Blender's Clamping and Filtering settings. The caveat to using these settings, though, is it diminishes the effect of light transport (caustics, indirect lighting and so on). But used subtly, it will dramatically reduce render times as well as create a cleaner render."



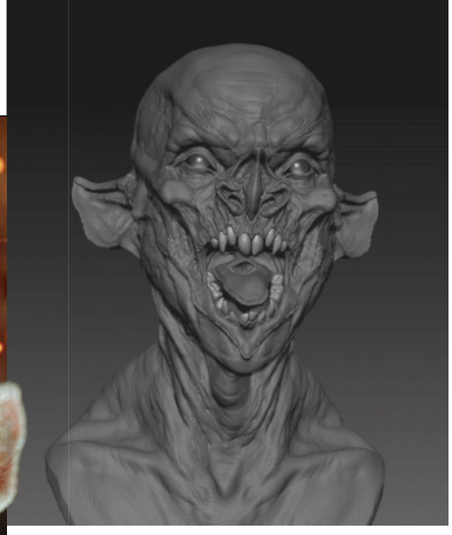
Exterior lighting is "easier and more manageable compared with interior," says Martinez

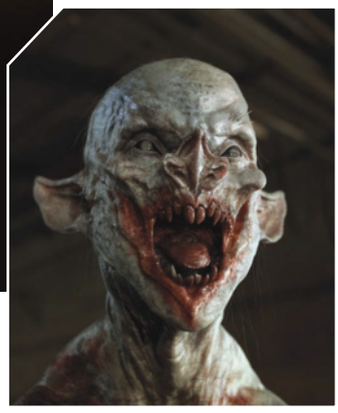
Getting out and about

Exterior lighting is a very different ball game, and as it's "an open space, you can virtually limit the light bounces that Cycles is performing, thus dramatically reducing render time, with relatively no artefacts (fireflies, noise and so on)," says Martinez. His approach is to "initially use IBL (image-based lighting) to give the scene an overall global illumination. After that, I go ahead and add a Sun lamp to emulate real-world lighting. It will then just be a matter of controlling the Sun's intensity, size and colour to achieve a well-lit scene, with soft/hard shadows and mood accordingly." If using Cycles, you can find the Light Paths tab and "limit the amount of light bounces specific to each type of light ray (Glossy, Diffuse, Transmission, Volume and so on). It's usually a better option to lower these when lighting exterior scenes since light convergence is easier to calculate, compared with interior scenes," he adds.



"I found something I liked very fast by going through the interior HDR environment maps," says Verhoeven





Tell your story

"Studying the work of Caravaggio, Rembrandt, Mitch Griffiths and Serge Marshennikov are the best ways you can learn how to light effectively, even breathtakingly," Verhoeven explains. "You can easily see how drama can be created in one image. It's all about storytelling," he adds. And it's also about taste, he divulges, "A simple area light setup is something that doesn't work for me to sell a shot," he adds. "I don't like to work with front-face lighting especially when you work with 3D; you create a digital statue with dimensions and details. The only way to make it work is with how you lit your object."

MAKE THE MOST OF YOUR MODEL

with Maarten Verhoeven

When you're lighting a model you have spent hours and hours lovingly creating, the most important thing is to show it off to its best advantage. Here, Maarten Verhoeven explains how he lit the **3D Artist** cover image, Dirt Devil, to frightening perfection.

Deciding which software packages to make use of for the project at hand is a big part of the equation of course. Verhoeven uses ZBrush, Photoshop and KeyShot. The latter is a favourite of his because Verhoeven likes to work quite fast, and to "see on the fly what I do when I adjust and work on images." His technique is to utilise "the HDR maps that are in the package and use extra geometry to create a light rig."

"Most of the time I use the bridge from ZBrush to get my model in KeyShot textured or clean," says Verhoeven. "Once in KeyShot I'll go through the different backgrounds to see if I like something 'out of the box', I'll start tweaking the HDR environment surroundings with the rotation, brightness and the gamma options. And if I can't find anything I want, I load up a black environment and generate some primitive geometry to light out the scene. Like a photographer would do in his studio – use a simple three-point light rig, existing of a key light, area light and a rim light to start with. For some small details I like to add some extra shapes to create an extra rim or highlight. Changes to the colour of the lights making them feel cold or warm also helps when depicting a scene."

Verhoeven's model is always at the forefront of his mind. He warns: "you create shapes in a 3D space that react to light, so you can destroy your hard work with bad lighting or even enhance it by making smart decisions in what you want to translate in your art."

Verhoeven's preferred setup "is a strong key light to expose the detail, an area light that softly lights up the whole figure and a strong rim light at the back to expose the bigger shapes."

Always accept help

"In this case the lighting setup was 'out of the box'. I found something I liked very fast by going through the interior HDR environment maps. And as always getting real-time feedback from KeyShot helps me to take fast decisions. I love to work in this way, I always hate render times and clients don't appreciate sitting [around] and waiting for results."

Unclean/clean

"For this project I tweaked the settings for how the light reacts on my chosen materials. I have the feeling that the plastic and advance shaders work fine with the light setups that I prefer most of the time. [When I am] happy with the result or when I have the feeling I have something to work with, I create a render. "

Colour up

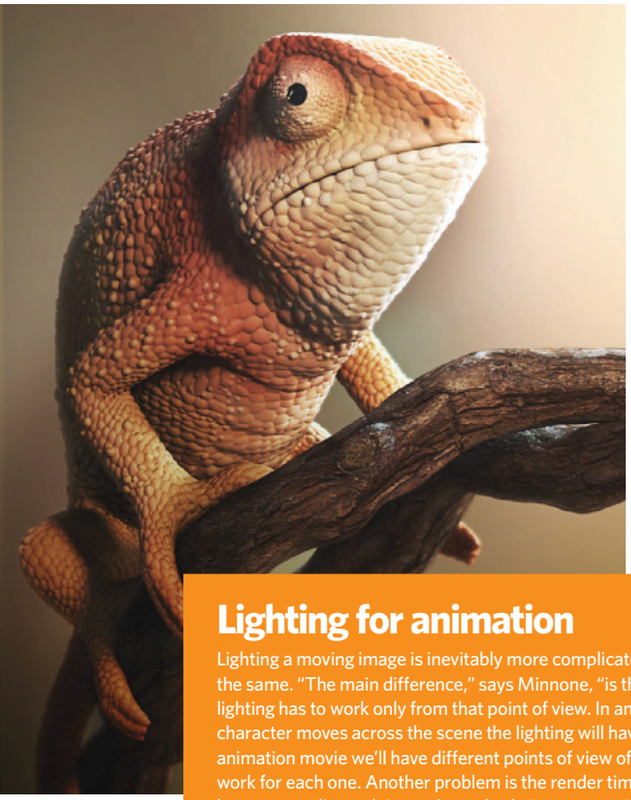
"I took it to Photoshop to play with the colours and brightness. Normally I avoid painting on models because I like to use clay renders, but for this I was playing with a concept. So I added some and overlaid texture details to give some extra drama to the final piece."

PERFECT CARTOON LIGHTING *wiht Flavia Minnone*

Flavia Minnone has been a professional 3D artist for three years. She started as a generalist, but she then specialised in lighting "because I think that this is the branch of CG closest to photography and painting, which I am really passionate about." Her intention in Farm (top right) was to "realise a cartoon environment that would allow me to play with colours and lights." She wanted the final piece to feel serene, using "contrasting tones, saturated blue in opposition with orange tones to focalise the attention on the main subject."

Bring on the moon

"First of all I set a general ambient light to completely avoid the black areas. To get this result I used a sphere with the normals reversed and I assigned to it a shader of blue colour with the emission's parameter activated, the latter in collaboration with the GI produce a diffuse illumination with very soft shadow. In the lighting for the cartoon, the HDR isn't extremely necessary except when we have a reflecting surface, which requires specific reflexes produced by a determinated environment."



"I believe that if we want to be a good lighter, is important to be a good observer. The creative phase is fundamental," says Minnone

"I believe that if you want to be a good lighter, is important to be a good observer," says Flavia Minnone

> "I added the fill lights, which help me to get more information in the dark areas. I don't place them in front of the camera as otherwise the composition seems flat"
> **Flavia Minnone**

Establish light sources

"After I added the moonlight with a blue/white hue, with sharpened and directional shadows, I wanted the patio to cast its own shadow on the building's front. For the farm I established my three principle sources of light, giving more emphasis to the one that lights the fence to immediately attract the observer's attention on the subject. For each of these lights I used the same colour and I applied a bit of volume light always of the same hue. I connected the mib_light node to these lights to get more control on the start and the end of decay. I added some lights inside the farm to give the feeling that there was someone inside, and I intentionally left the ones on the ground floor turned off to give more emphasis to the exterior lighting and a better balance of the image."

Detail in dark areas

"Then I added the fill lights, which help me to get more information in the dark areas. I don't place them in front of the camera because otherwise the composition seems flat; they have less intensity and soft shadows to avoid confusing them with the main light source. I then used rim lights to define and delineate silhouettes – these lights help to detach one object from another, giving more depth to the image. According to where we are going to position them we will give more or less emphasis to objects in the scene. In this image I used a couple of rim lights for trees (in particular in the trunk area), another one on the right side of the farm, behind the windmill and the last one is of an orange colour near the fence."

Fog your results

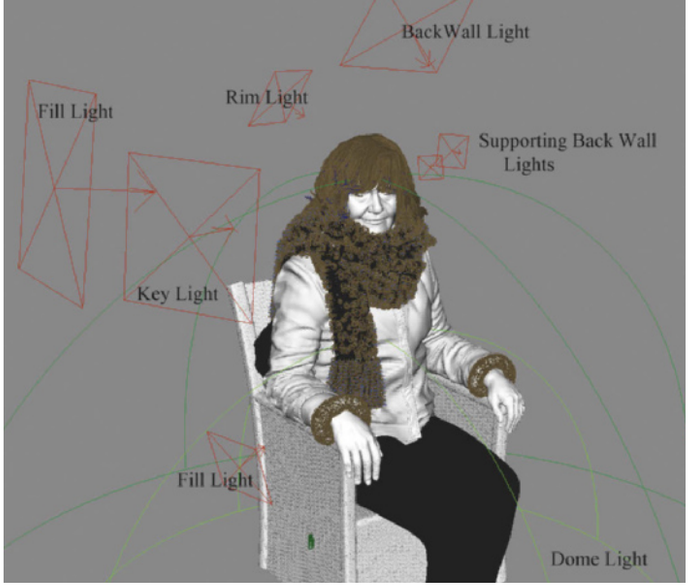
"When I decided that the scene was finished I subdivided it in render layers to have more control in the compositing part. I separated the beauty of the foreground from the one in the background in two render layers, I managed the environment fog in an isolate layer and I did the same for the volume light. At the end I set the render pass as ambient occlusion, Z-Depth, fresnel and ID."

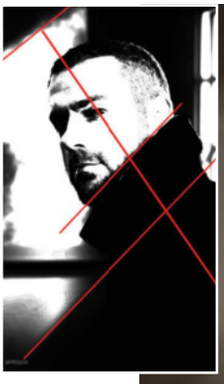
Minnone did the lighting here for her friend Pietro Licini's model. "Sharing knowledge with other artists is the best way to learn new tips"

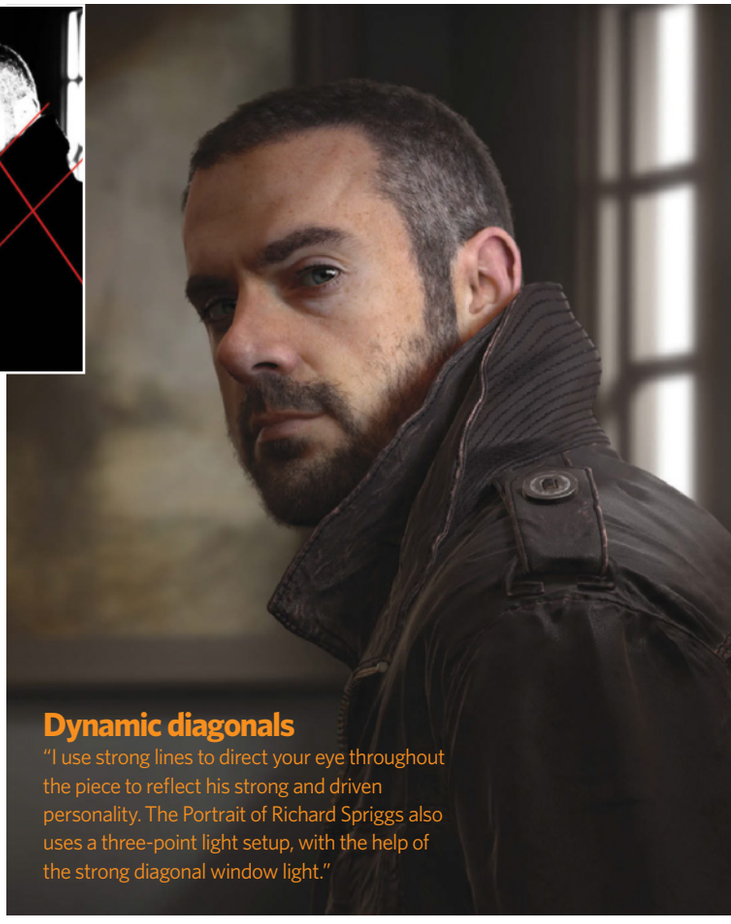
Lighting for animation

Lighting a moving image is inevitably more complicated than lighting a still one, though the techniques are the same. "The main difference," says Minnone, "is that in the still image we have only one frame and the lighting has to work only from that point of view. In animation we have to take care of more factors; if a character moves across the scene the lighting will have to work for all the movement's range. Often in an animation movie we'll have different points of view of the same environment, this means that lighting has to work for each one. Another problem is the render times: indeed it is important to find the right balance between quality and times. A good solution to save time in rendering is to split the scene in render layers, dividing the moving objects from the static ones. It is also useful to have a content number of lights and understand the contribution that each one gives to the scene – it is not always necessary to put all lights in every single render layer."

The set-up and planning process is crucial when you want to achieve work as realistic as Ian Spriggs does







Dynamic diagonals

"I use strong lines to direct your eye throughout the piece to reflect his strong and driven personality. The Portrait of Richard Spriggs also uses a three-point light setup, with the help of the strong diagonal window light."

USE LIGHTING TO CREATE LIFE *with Ian Spriggs*

The crucial thing about lighting is that it's not there just to illuminate and show what is in the scene, it's also to draw the eye, to add movement and to breathe life into your work. Without good lighting, even the deftest model or the most detailed scene will look flat. Ian Spriggs is a character modeller for blockbuster movies by day, and in his own time he creates the most stunning photorealistic portrait images, mainly of his family, and lighting is what makes his work really sing.

Spriggs works in Maya, Mudbox, Photoshop and V-Ray, and he takes inspiration and reference from "the masters, such as Rembrandt, Vermeer, Caravaggio and Van Dyck." He explains: "Lighting to them was just as important as the form, so much story and emotion can be brought out in how the piece is lit. Lighting is great to help with composition, it can make viewers pay attention to certain details, create eye movement throughout the piece, and even keep the viewer's eye within the boundaries of the picture frame."

Both interior and exterior lights come into play, and Spriggs' work is all about capturing how it falls

Create a hot spot

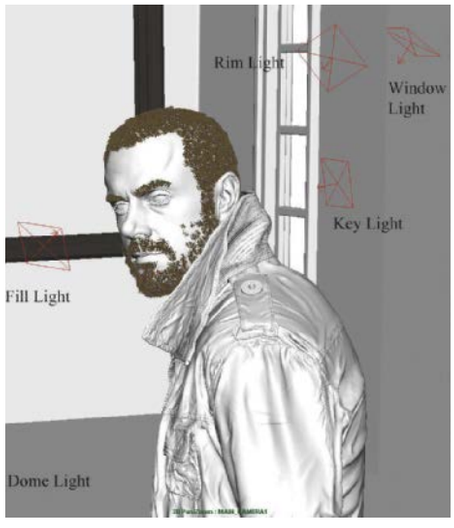
"In the Portrait of Pamela Spriggs (top left), I used the basic three-point set up, a key light, a fill light and a rim light. First I wanted the viewers to look at the eyes – not only did I make it the brightest spot I also created the most amount of contrast in this area, and to exaggerate it, a hot spot on the wall behind creates even more contrast. I wanted the lighting on the wall behind to push her face forward.

Push your patterns

"Secondly, after seeing the face I wanted the scarf to direct your eyes down to the hands, almost as a pathway down. Creating the pants, chair and jacket relatively the same colour allows the hands to pop out more. Lastly, a curtain [is used], a vertical line keeping your eyes with the border of the picture and directing your eyes back up to her face. I tried to use the lighting to keep your eye in a repetitive circle pattern within the picture."

X marks the spot

"In The Portrait of Richard Spriggs (right) I wanted to create a really dynamic piece. I made the light come in through the window at an angle with two parallel lines; it is in contrast of his body at an opposing angle, in a way creating an X shape. I was hoping to create a strong mood by doing so."



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Technique focus

Incredible 3D artists take us behind their artwork

MODELLING Lois was based off a painting by the artist, Loish. I used DynaMesh to block out the major forms and when I had a semblance of the sketch, I used ZRemesh to give me workable topology. From there, it was a case of refining with Clay, Standard, Dam_Standard and Move.

Francis-Xavier Martins
polyjunky.com

3DArtistOnline username
Polyjunky

Software ZBrush, KeyShot

Lois, 2015

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20 ARCH-VIS STYLE SECRETS

We spoke to visualisation masters to get their best practices, favoured approaches and top toolkits for creating compelling arch-vis

From tall, sci-fi type skyscrapers to cosy log cabins with a snowy backdrop, one of the most popular genres of digital design is arch-vis. To find out the top methods for designing beautiful arch-vis, **3D Artist** spoke with with a number of practitioners about their working process and advice.

Jane Chambers, senior 3D artist at creative communications agency The Neighbourhood in Manchester, tells us the importance of context in environment design: "It is that instinctive emotional connection that people have with their environments that we look to invoke in our imagery. Texture provides depth and richness to a surface that appeals to our natural instinct 'to touch'."

In the comments from the artists that we reached out to, it was clear the creative relationship between a combination of design flair and, perhaps some degree of design wish-fulfilment with the boundaries of reality, is key to the process.

CONTRIBUTORS

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Bobby Parker
bobby-parker.com
Architectural illustrator

Uffe Kjaer Thomsen
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Image specialist

Dušan Vukcevic
vudumotion.com
3D motion designer

Scandinavian bedroom by Dušan Vukčevič

Golden Rule

01 I always try to combine different techniques and think outside the box. That's the most important thing in creating stunning art. *Michael Nowak*

Starting a project

02 I usually have a basic idea of what I want to create and just start working in 3D: no sketches on paper or in Photoshop. I try not to look at reference photos in the design stage. I make things up as I go to see where it takes me. Sometimes the final result is completely different from the initial idea. *Dušan Vukčevič*

Getting into the flow

03 My typical workflow for a project starts with seeing what's out there, so I gather as many reference images as I can. Then I start by drawing or, usually, blocking out my own design in Maya on what would be possible to build based on what already exists. But I try and make whatever I'm designing unique – I'm not trying to just model something that another artist has designed. Then I have to try and make it look as appealing as possible while making it believable. I work using a games engine (CryEngine) so it's not always easy to make something look as photorealistic as someone who uses actual rendering software. But I think that's part of why I chose to use it, because it was a challenge. *Lauren Colclough*

Pay close attention

04 In our world, most objects do not have hard edges. Maybe it looks like they do, but with every edge there is a little bit of roundness. Remembering this will give you a more natural look and better reflections. *Michael Nowak*

Being efficient

05 Make a basic scene, with the basic objects that you know you will use often with lighting already set up. You'll enhance your productivity. *François Béthermin*

Welcome feedback

06 Ask for some constructive criticism from people around you, especially from people who don't know 3D. *François Béthermin*

The floor

07 In any design, always pay attention to the floor. It has to look good! With every interior most of the light is catching the floor. If you set correct values you can get really beautiful results. Look at how light spreads. *Michael Nowak*

Black Living Room by Dušan Vukčevič

Jardin d'Hiver by François Béthermin

Disruptive patterns

08 In the modelling process I try to add subtle disruptions, like adding an irregularity to the fabric or chips in timber boards. I avoid placing the objects perfectly in the scene. I will often add some slight rotation on all three axes.
Dušan Vukčevič

Organising your work

09 Back up and back up your backup! Personally, I keep every file that I used to create the project in its own project folder. Use good naming conventions and folder structures to keep everything organised. *Bobby Parker*

Lighting

10 Leave openings behind the camera instead of using additional lights when the scene is lit by HDRI. The light falloff will be more natural and the rendering process will be faster.
Dušan Vukčevič

Adding subtlety

11 Be subtle, very subtle. Add your special effects, like ambient occlusion, and once you can hardly see it, it's probably good to go. Make sure you stage your environment so that it looks good. *Bobby Parker*

Toolkit

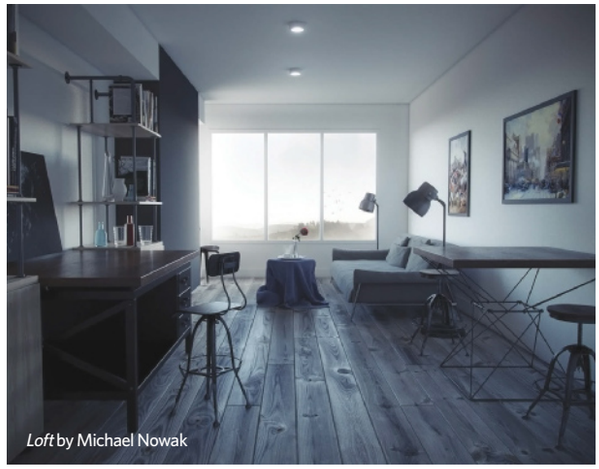
12 I've found that CryEngine is a very effective tool in my work because it allows me to make changes quickly. I'm not hindered by long render times so if I want to change the layout of an entire room I can change it in Maya first, then re-export it and rerender it within half an hour to the very best quality. I try and test new software when I can just to see if I can include it in my work or if it can help improve on anything in my toolkit at that moment. *Lauren Colclough*

Shading and rendering

13 I will use Cinema 4D for modelling and then V-Ray and OctaneRender for shading and rendering. I mostly use OctaneRender, which is GPU-accelerated and unbiased. It works very fast if you have a good graphics card (or multiple cards). It has almost real-time previews, which makes the lighting and shading stage really quick, and this gives you a lot of room for testing or experimenting.
Dušan Vukčevič

Model with Cinema 4D

14 I use Cinema 4D a lot, which is an easy go-to program and very intuitive. For my renders I will use V-Ray because it always does the job.
Uffe Kjaer Thomsen



Loft by Michael Nowak

Happy Holidays by Dušan Vukčevič

Chromatic aberration

17 Chromatic aberration (also known as 'colour fringing' or 'purple fringing') is a common optical problem that occurs when a lens is either unable to bring all wavelengths of colour to the same focal plane, and/or when wavelengths of colour are focused at different positions in the focal plane. Chromatic aberration is something people have gotten used to seeing in photos. When you work with 3D art, it is important to remember those details if you want to increase realism of your scene. Combining HDR with sunlight can give you not only beautiful shadows, but provide more reflections and give more diversity to your scene. Why do you need to care about those details? Because you want your art to be believable. ***Michael Nowak***

Controlling material

18 What rules and experience do you work with when developing textures and shading? It is important to analyse real-world materials; look at photo references which help you understand how these should appear in the final image. I closely observe the way materials react to light and try to implement it in shader creation. I also apply real-world values like index of refraction. This kind of information is available online so check out a site like **refractiveindex.info**. I only use high-resolution textures so the renders look sharp and more realistic. Render out multipass images or render elements, so that you have additional control in post-production. ***Dušan Vukčevič***

Semi-Underground House by Lauren Colclough

Finessing the image

15 Finally I add camera imperfections in post-production. A few of the ones that I use are chromatic aberration, vignette, lens distortion, noise and bloom. ***Dušan Vukčevič***

Form and function

16 I always try to keep in mind the kind of 'imperfections' that we see in real life, but when I'm working on a project I've found that it's very easy to want to make things neat and tidy, especially if it's something modern. Working with a digital environment I always have to remind myself that nothing is ever perfect; even if it's only rotating pieces of furniture, so that nothing is ever perfectly straight, or trying to add in everyday objects to populate a scene. Arch-vis is a chance to be creative. It offers the challenge of looking at interiors or exteriors and trying to understand what the designer intended. It's interesting to try and merge functionality with aesthetics to create something new. ***Lauren Colclough***

3D viz (Raw) by Uffe Kjaer Thomsen

Inspiration and application

19 Textures are an important part of the work because they can mean the difference between making something look realistic or not. I've gotten into the habit of taking photographs (it doesn't have to be a professional camera, I use my phone) of wall textures, floor tiles or just objects that I find interesting, things like that, whenever I go anywhere. I visit a lot of National Trust sights and museums so I have a library of textures I can choose from. It always helps to look at reference photos rather than doing something off the top of your head. In the end, it benefits the work and practicing making new textures helps as well. Always keep in mind whether you, yourself, could use whatever space you've designed for its intended purpose. It helps with the design process. If you can, visit new places – it's a great opportunity to get inspiration. ***Lauren Colclough***

Stay aware

20 Stay aware of new technology, hardware and software. There are often new solutions in arch-vis, like Unreal Engine. Don't be afraid to learn new things. ***François Béthermin***

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The Pipeline

Expert advice from industry professionals, taking you from concept to completion
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"Remember to keep your geometry low poly and non-extruded at the block-in stage as this will enable you to easily add edge loops and merge vertices"

Design a high-tech racing machine

Create a vehicle based on F1 cars and hot rods – and infused with sci-fi influences – to create a futuristic racer design

Designing vehicles is fun, but this can also be challenging at times. We will need to figure out appealing forms, size relationships and details that are fantastic and yet rooted in reality. This design has been based on a combination of F1 cars and hot rods as these vehicles tend to have wonderful exposed areas that give us a view of the awesome mechanical elements that make the machine work! For this tutorial we will follow a design process that can be used for other models.

We shall explore modelling in Maya, Rhino and ZBrush to produce specific elements.
We will then learn how we can use the strengths of each of these programs to add to our model. This project is a great opportunity for us to experiment with different software packages since we will be producing custom components and fitting them to our design. The end goal is to produce a textured 3D model that can be rendered.

IGOR SOBOLEVSKY
Axiom Feral, 2015

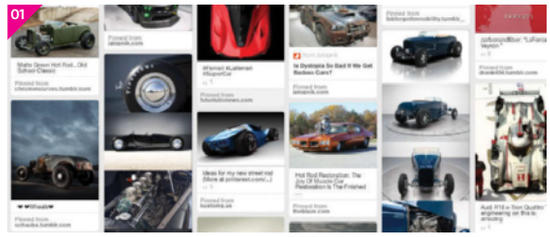
Software
Maya, Rhino, ZBrush, KeyShot, Photoshop

Learn how to
- Design a vehicle
- Texture the vehicle with maps and decals
- Light the model
- Collect appropriate design resources

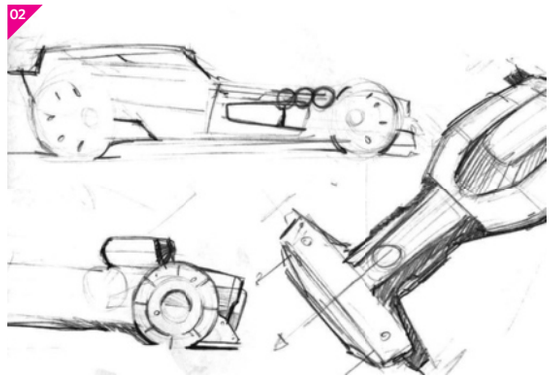
Concept
I was compelled to design an oversized racing machine that embodies brutal strength as well as speed and agility. This all-wheel drive electric racer is a force to be reckoned with on the track.

YOUR FREE DOWNLOADS from **filesilo.co.uk/3dartist**
- Tutorial video
- All tutorial asset files

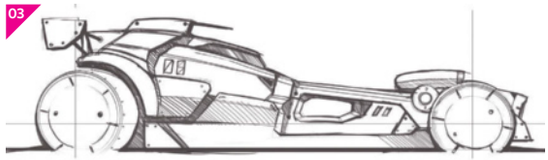
01 Reference collection A great place to start is the collection of applicable references on Pinterest or on Tumblr. Build your own board that contains interesting things to inform your design. Try to also look at objects in a different category from your design intent. This can take your ideas to very interesting and unexpected places. When designing a vehicle why not look to something like an aircraft or an animal for inspiration!



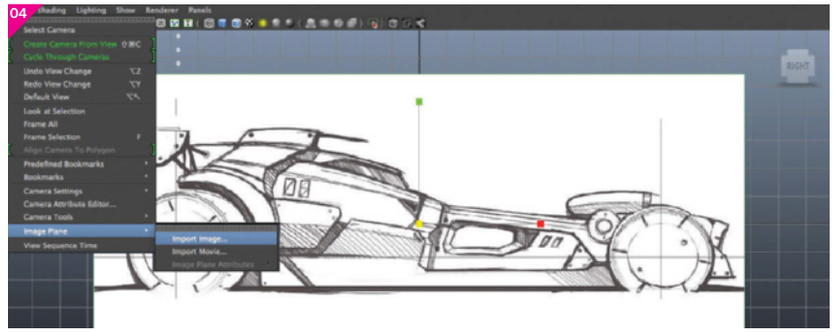
02 Loose sketching Once your inspiration is firmly established, start doing some loose sketching. You can do this both traditionally or digitally – this really depends on your personal preference. Don't be afraid to make ugly sketches at this point. Sketch loosely and be comfortable, however you should keep the end goal in mind. We are doing this to figure out our design. These drawings can be cleaned up and used as an underlay later in the process.



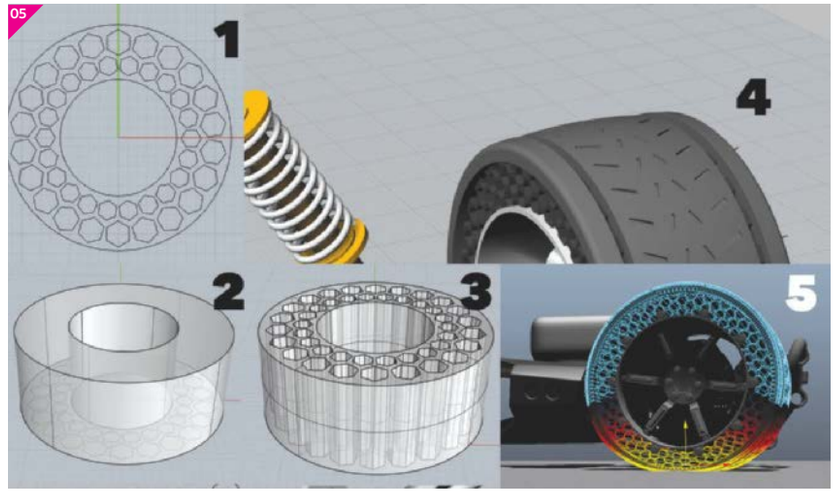
03 Tight sketch Using loose sketches as an underlay, create a final sketch that can be placed in the scene. For vehicles, generally a side view contains the most information. For instance, look at the position and proportion of the wheels in relation to each other. The general shape of the body is clearly visible as well since there is no foreshortening or other perspective distortions. If the image was produced traditionally, then take a photo with your smartphone in a well-lit environment and transfer that to your workstation.



04 Import your sketch into Maya At this point in the process it is important to have somewhere to begin; the sketch that we made prior is a great way to start building your racer! In Maya, go to the panel layouts to enable four viewports. Then select the side view, go to the View button and select Image Plane from the drop-down menu. This will let you select your sketch. When it is imported, hit W or select the Move tool from the toolbar. This will let you position and scale your drawing. Get the bottom of the wheels positioned right at the bottom on the ground grid.



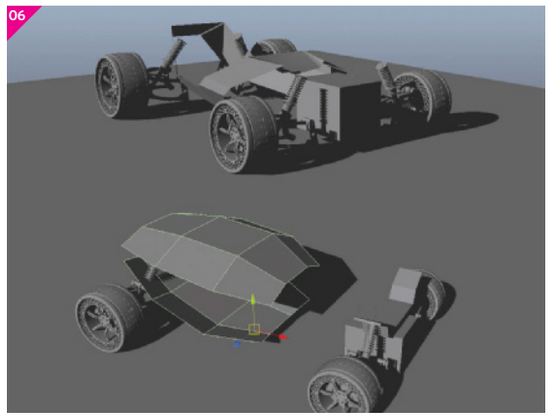
05 Wheels and suspension Begin by making a cylinder or a tube – this is a base for your tire. Make sure the tube has eight to ten sides, and this can be done in Maya or Rhino. Use simple geometry to block in the necessary parts. Look at images of suspensions to get a basic understanding of how the system works. Use primitives to make struts, springs, and hinges for your suspension. Utilise Move tools to position the elements in place and start adding edge loops and extruding polygons. Make sure to protect your edges with additional edge loops. Then smooth your geometry. Enable soft selection in Maya's tool settings and select the vertices on the wheels that are contacting the ground. Now move and scale the soft selection to simulate tire compression.

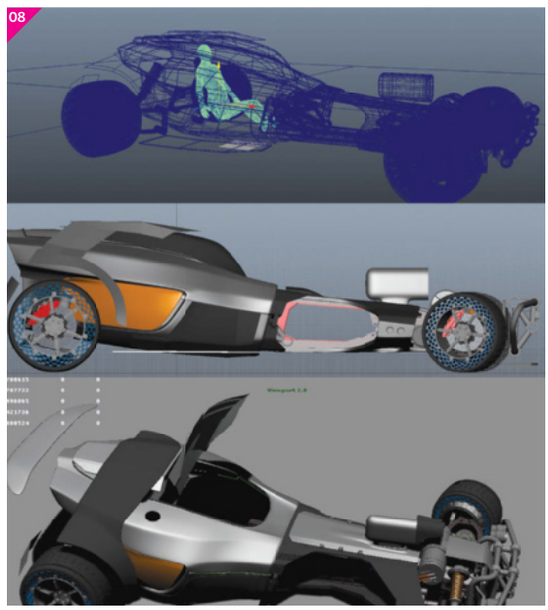


06 Block in the body Start with cubes to represent the engine compartment and the main body. Subdivide the cube with a couple of edge loops. Proceed by deleting the bottom and sides of the cube. The resulting plane should have a number of polygons. Switch your selection to vertices and begin to manipulate the plane in order to give it some volume. Remember to keep your geometry low poly and non-extruded at the block-in stage as this will enable you to easily add edge loops and merge vertices. Duplicate the shape, flip it and position it underneath. Then you can bridge the two planes to create a volumetric shape.

07 Build on the existing geometry When you are satisfied with the initial body geometry begin duplicating faces to produce parts like fenders and side skirts. Extract polygons along the top of the body to produce the cockpit enclosure. This technique will save you time since the general edge flow and shape will be maintained in the extracted geometry. For instance, the back quarter panel was made by duplicating rear faces on the body and bridging them with a non-extruded cylinder. Use this method to generate separate parts as opposed to importing or creating a new primitive. Always keep your edge count in mind. An equal number of edges makes for easy geometry bridging.

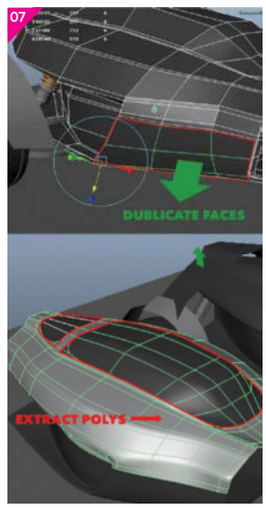
08 Assess your design Take a step back and look at your design. At this stage you can make adjustments. For instance, the front section seemed too long and so it was shortened. The hood scoop was too obtrusive and was modified to have a horizontal configuration. These elements were easily adjusted due to the model's modular nature. Make sure that the design works together and forms are pleasant and cohesive. Decide how you will distribute the detail density. The exposed front section is a great place to showcase the suspension elements and liquid cooling system, complete with pronounced fan enclosure as well as the electric motor.





Human factor

Incorporate a human form by placing a model in the scene. This should help you establish scale relatively early in the process. That way you can imagine proportions of the vehicle better. This helps the designs look more realistic. Export a human body model from Mudbox and keep that OBJ handy.

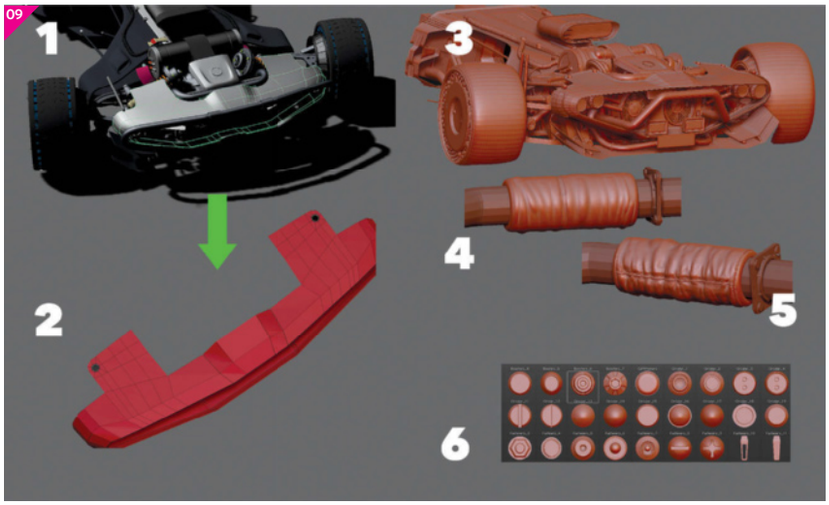


09 Add details Now relax a bit! All of our essential forms are established and we can start adding some details. At this time, select the existing geometry in Maya and export the selection as an OBJ file. This can be imported into ZBrush as a tool. We will be using the ZModeler brush (hit hotkeys B, Z, M) to refine the vehicle. Use the Point Split tool to make mounting points on the hood. Make a cylinder, subdivide it and sculpt insulation fabric. Select a stitch brush to add some stitches. Use the IMM_Modelkit brush to quickly add rivets, vents and screws on top of the our existing geometry. Then export the new elements to OBJ and add it to our Maya scene.

10 Prepare for importing to KeyShot Now let's look at our model and think about how our materials and colour scheme will be laid out. Since the final rendering will not be made in Maya, the material colour and properties do not have to be exact but the differentiation between parts has to be. For instance, you may want to assign a material to all of the frame and suspension elements. Add a transparent glass shader for the cabin enclosure and headlights. Look at the model and think how materials are distributed in a real vehicle (lights, carbon fibre, tires, shocks, paint and so on). When making a shader in Maya try to name it so it will be easier to assign the correct material to a part for both Maya and subsequently in KeyShot.

11 KeyShot import and setup Drag and drop your model into an open KeyShot scene. Adjust your import options as shown in the image below, but keep in mind that these do not have to be followed exactly. At this point all of the materials are rendered with default settings. We need to apply new shaders to achieve the desired look. Select all of the model parts in the project toolbar and link them. This will apply the same material to all of the parts. Think of this step as making a uniform material underlay. Apply a dark matte material to the whole model.

09



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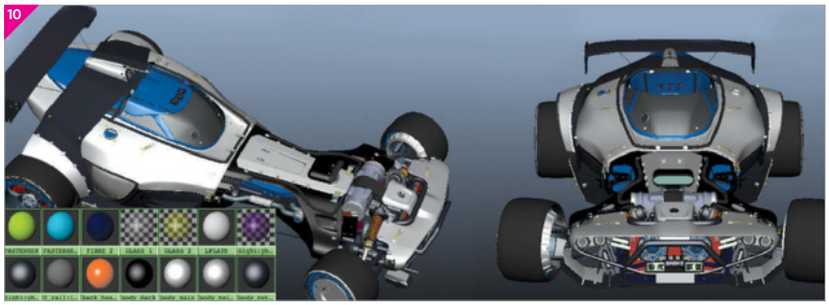
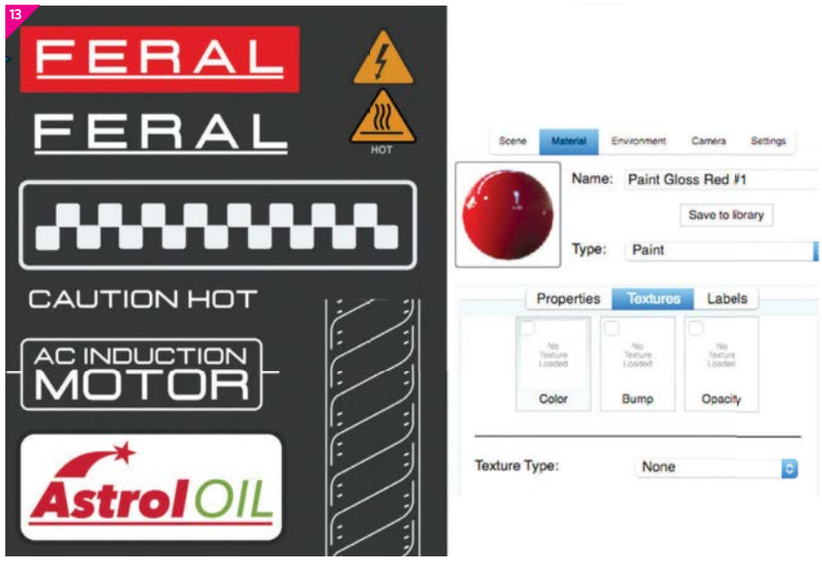


Use various programs

Do not be afraid to use a variety of modelling software. If available to you, use design packages for their particular strengths. Rhinoceros is great for detailed machined parts, as shown in Step 5. Use Boolean tools to add and subtract from your geometry in order to get awesome, precise machined parts. A command prompt in Rhino lets you type in and execute a command (like Boolean Difference, Boolean Split, Extrude and so on).

11



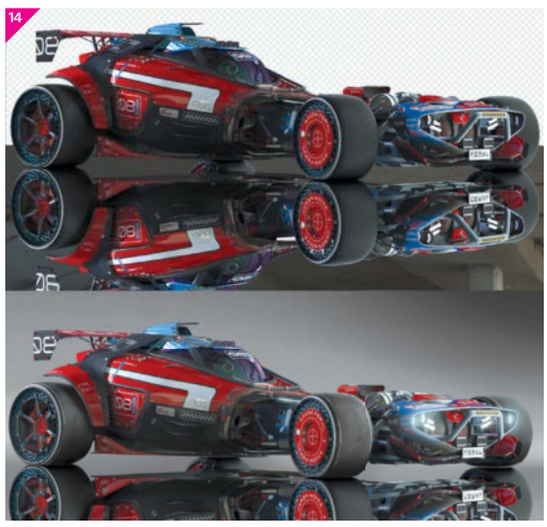
12 Apply materials and lighting Begin by selecting all of the parts of the model and unlinking them. Proceed with selecting the desired materials from the library window and dragging them onto the model. The material properties should remain linked according to our original Maya shader specs. At this point, have fun and experiment with various materials by double-clicking them and adjusting their parameters. Now tweak for a desired roughness, refraction index and colour. From the KeyShot library window, select the Environment tab. Let's apply an environment that best accents our model. If we need to add an additional accent lighting, we can import a sphere and apply an IES spot light material to it.

13 Decals and rendering Double-click on the material and select the Textures tab. Drag your decal onto a Color block. Note that KeyShot 4 only lets you apply one image in the colour section, so be strategic in mapping this element. This design benefited from racing stripes placed on the sides. If there is a need for additional graphic elements, apply them as a label (PNG at about 88 per cent opacity). Experiment with the mapping type for best results. Place a tire tread Bump map on a tire and select UV mapping. Dial in the camera settings in the project window and save these parameters. Select your render resolution and quality, hit render, sit back and relax!

14 Photoshop setup Let's open our render in Photoshop now. As you can see we have rendered out our model with a reflective plane underneath. This way we get the most intense reflection possible. At this point we can create a new path layer. The point of this operation is to separate the background from our render. Then we can create a new path that separates the reflection from the main render. Once our reflection is on a separate layer, apply a layer mask. At this point we can use a gradient tool on the mask and achieve a nice gradient on the reflection.

15 Background and shadow Now we need to add a background to our image. A simple studio background lets us focus on our vehicle. You can start by creating a new fill layer behind the model. A smooth gradient can be achieved by using a gradient tool or by creating a new levels adjustment layer over the background. The utility of an adjustment layer cannot be understated – this non-destructive way of working will save you lots of time. Shadows can be achieved by using the original render output and modifying it by using adjustment layers. Now reference the provided PSD file!

> "The utility of an adjustment layer cannot be understated – this non-destructive way of working will save you lots of time"



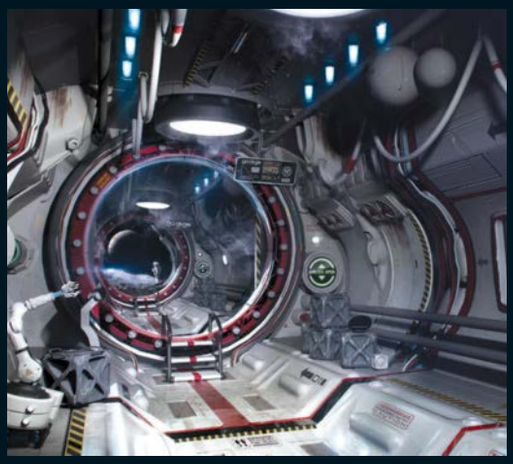
Back up your parts

It's easy to get carried away when building your model. You may find yourself with a detailed part that somehow does not fit in the design. When you achieve a desired look on a low-poly element, duplicate it and move it under the main scene. This way you can proceed with subdividing your parts and have a low-poly backup in your scene too. Adding extra back-up elements to a separate layer in Maya is great for keeping your scene clean.

Showcase

Igor Sobolevsky

I am a designer working in the fields of industrial, concept and graphic design. I enjoy applying industrial design processes when building sci-fi equipment. Here is a look at some of my favourite designs.



Airlock One **Maya, KeyShot, Photoshop (2014)**
An airlock of an Aurora Mining Corporation outpost on Europa, one of the moons of Jupiter.

Infiltrator **ZBrush, KeyShot, Photoshop (2015)**
This is a humanoid drone, designed for surveillance and intelligence collection.

BFT 0109 **Maya, Rhino, KeyShot, Photoshop (2015)**
A large expedition vehicle designed to handle long missions in various rough environments.

16 The human model Size reference is very important in design. When we look at our surroundings, we can judge the size of the objects by using ourselves as a unit of measurement. That is precisely why it is important to show a human figure in the presentation. Use your own photos for this step! Try to get images that match the lighting of your final render. Utilise an adjustment layer to tweak lighting so that the render and the image asset have a similar feel. Exposure and Levels adjustment layers are great for bringing out highlights and shadows. You can also use your logos on the uniform of your pilot – this will bring all the elements together.

17 Lighting and final adjustments Now that all of our elements are in place, let's add some atmosphere and lighting effects. You can get some awesome lens flares, smoke, and dust particles from **cgtextures.com**. Experiment with blending modes in Photoshop too. Screen and Color Dodge tends to work well for these effects. Identify an area with the most intense light and add a lens flare to it. Try not to oversaturate the images with lens flares since this can take away from your render. Finally, let's make vibrance and photo filter adjustment layers. Reduce the vibrance of the image and apply a photo filter on top. Save your image, and be proud of yourself!

16

Branding and logos

Graphic design is quite important when texturing and defining your models. Think about real-life hardware where there are logos, descriptors, warnings and basic instructions. These tend to add a level of realism and life to your design. Use Illustrator or Photoshop to make your graphic elements and try to stay away from premade graphic assets. Think about the purpose of your design. This will dictate the nature of your graphics. Since we have a racing vehicle we will use the team brand and number as well as other logos to detail our machine and pilot. Try to export your decals at about 88 per cent opacity as this helps them to appear more realistic.

17

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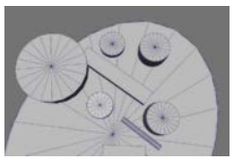
DUŠAN KOVIĆ
Coffee Table, 2015

Software
Maya, Arnold, alShaders, Photoshop, UVLayout

Learn how to
- Model a still life scene
- Create believable texture maps and UVs
- Use Maya's particle system to create dust
- Set up a shader with alShaders and get realistic shading results
- Light and render with Arnold
- Do post-production in Photoshop

Concept
The main idea behind the Coffee Table render was to push the limits and knowledge of 3D software to achieve a new level of hyperrealism in computer graphics.



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- Tutorial images

Make your renders look like photos

Create a visually compelling story using realistic textures and image-based lighting, all with simplicity in mind

In this tutorial we are going to cover methods of achieving hyperrealism using Maya, Arnold and Photoshop as our main tools. Aside from these tools we will use UVLayout for our UVs and alShaders as our main shader for this project. Using Maya we will then model the entire scene and also shade the objects in Maya's Hypershade. This is because Arnold has great integration in Maya; and we will use the MtoA (Arnold for Maya) plugin for our final rendering. Using Photoshop and **cgtextures.com** we will create our base textures, and later refine them during our shading process. After the final rendering, we will make use of Photoshop to composite our final image.

01

01 Get inspired The first step is to visualise your artwork to get an idea, and so you can plan your workflow. Our main inspiration for the Coffee Table is just a single dirty glass and a test shot from a new camera lens. From the photo, you can see there is a a lot of detail in the smudged glass, not just plain glass surface. There are smudges, fingerprints, small scratches and bumps. Creating all of those details is really important in order to create a believable render that is indistinguishable from a real photo.

02 Collect references First we need to collect photos for references. For this step you could use just a basic mobile phone to take pictures for your references. Be careful to take your reference photos in good lighting to avoid noise. Take a lot of photos so you can see as many details as possible. Later you can filter out the photos that you don't need.

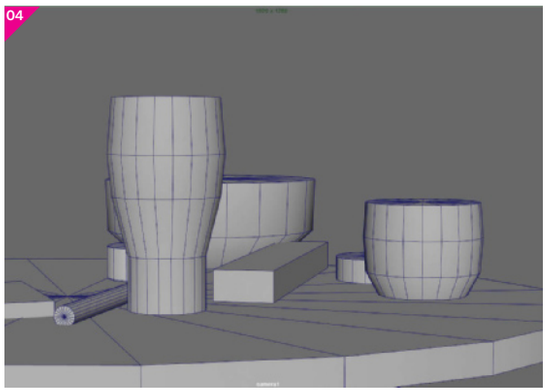
02

03 Final concept At the end of reference collection, we decided to create a photo of all objects on the table. Start by placing random objects on the table and try to create a pleasing composition. When you are satisfied with the composition take a picture with your camera. This image served as our main reference for the final composition and scene arrangement.

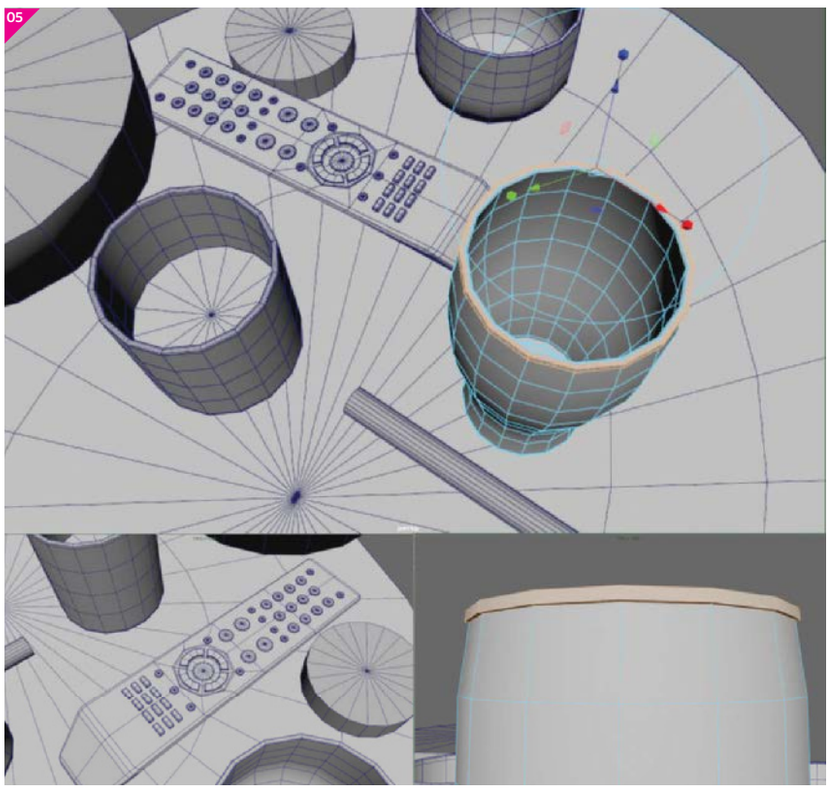
03

Using refBoard
For reference viewing we are using a great program called refBoard. Its main purpose is to view your references in a good and organised way. In our opinion it really does a great job. It's always on top, you can scale and arrange photos and you can also save your boards so you can use them again later. You can download this free program here: **designerjon.com**.

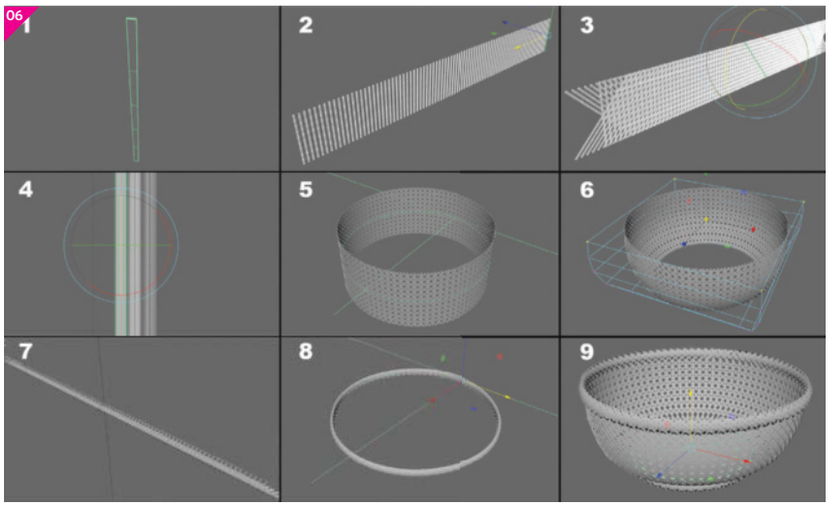
> There are smudges, fingerprints, small scratches and bumps. Creating all of those details is really important in order to create a believable render



04 Basic scene layout In our workflow, the first step in the modelling process is to use just basic shapes to block out the entire scene. Use cylinders and boxes to create a layout of the scene. Also, use this layout to set up the camera in the scene. By working this way, you can change placement of the objects and camera really quickly. We will be using an 80mm focal length on the camera because it provides a nice compression of the perspective. When you finish this step, you can decide on the parts of the scene you are actually going to model, you don't need to model parts of the scene which are not visible.

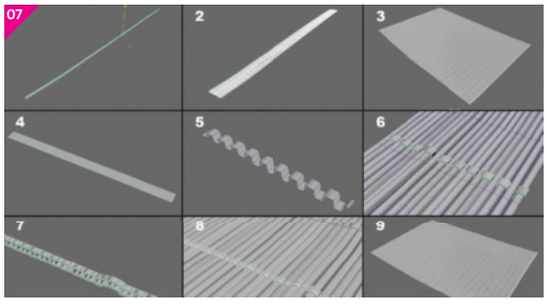


05 Model glasses, remote and table We are going to start with easier shapes like the glasses and remote for modelling. Using Multi-Cut, Extrude and Bevel tools from Maya's Modeling Toolkit, it's easy to create more complex shapes from our basic geometry. Be sure to check references so you don't miss small details, like an extruded top edge on the big glass, which is going to give nice specular reflections. Also model out the juice geometry in the small glass. Only use the smallest amount of polygons necessary. A better approach is to use render-time subdivisions to smooth out the surfaces, so make sure to put some edge loops near hard edges so they don't collapse when they are smoothed during the render. You can always check this by pressing number 3 (smooth preview) on your keyboard.



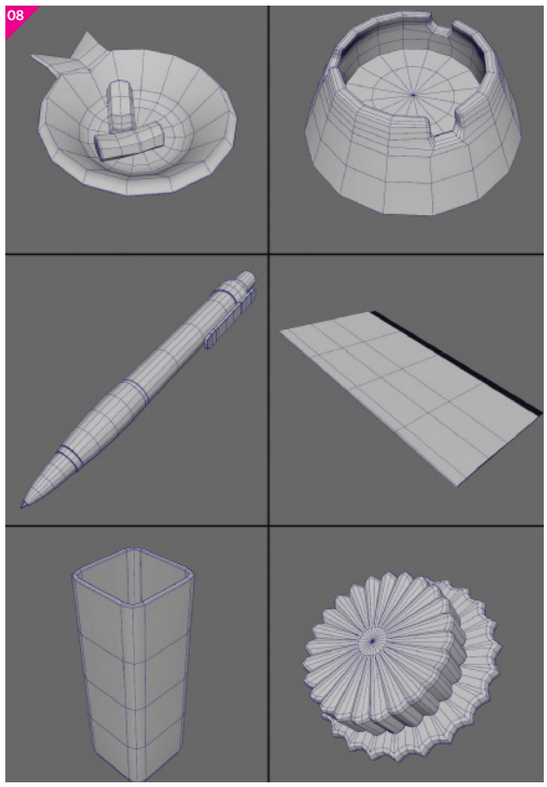
> "Use the Lattice tool to better match ropes with the table cover"

06 Model the basket We will start with one box primitive. Adjust height and width as desired, set the subdivision's height to 5 and bevel the outer edges. Duplicate that box about 30-50 times. Again, select all of the boxes, duplicate them twice and offset each set of boxes a little bit on the z axis. Rotate each set of boxes by +45 and -45 degrees (check boxes 3 and 4 in our screenshot). Select all of the boxes and combine them in one piece of geometry and delete the history. Do a planar UV projection on this whole geometry as we will need this in the texturing part. Duplicate new geometry; we will need another copy later. Go to Deform>Nonlinear and apply Bend on your mesh and set Bend to about 200. Use Lattice to adjust the shape. Now take that other piece of geometry and bend it the opposite way to get a tube (box 7 in the screenshot). Now, bend it again to get the circular shape of the top piece of the basket. Duplicate that piece again to get the bottom part of the basket, and use a simple cylinder for the basket bottom.

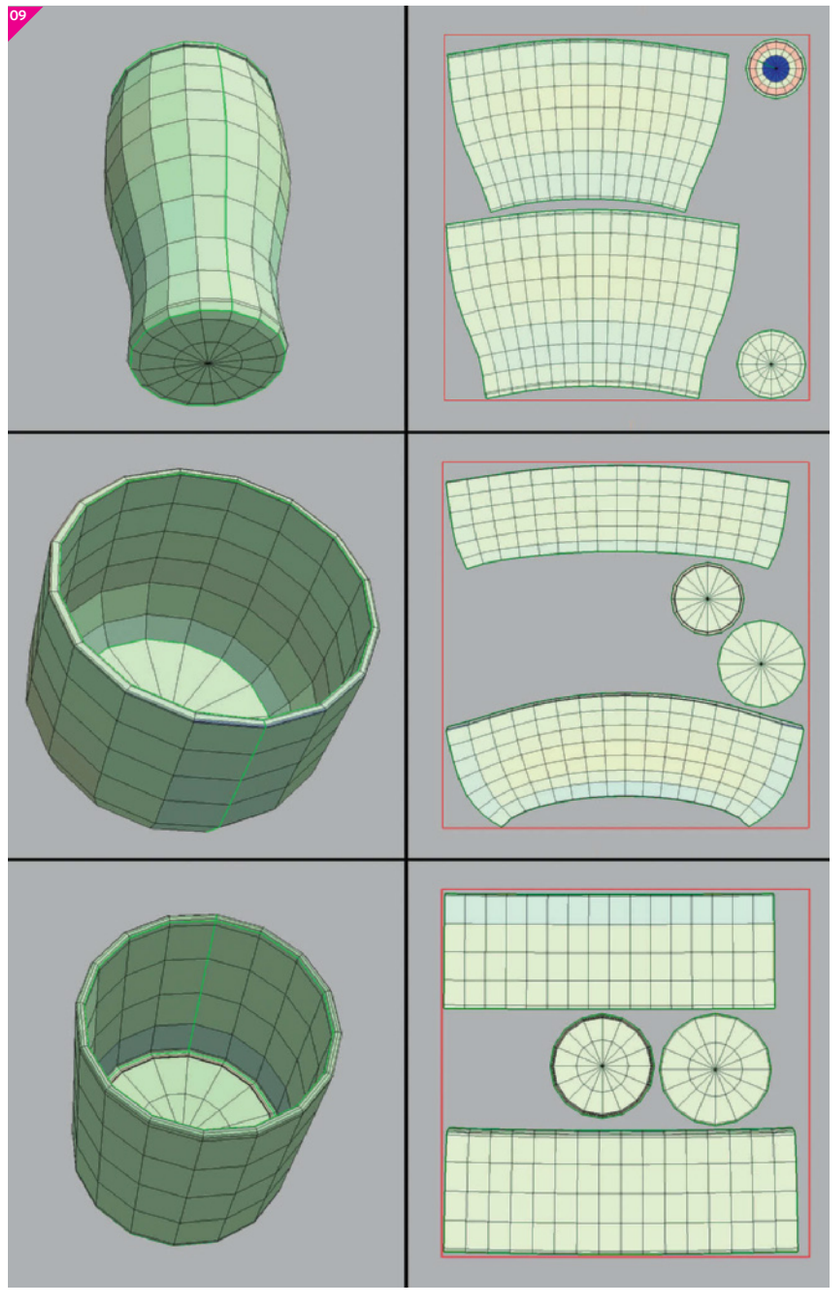


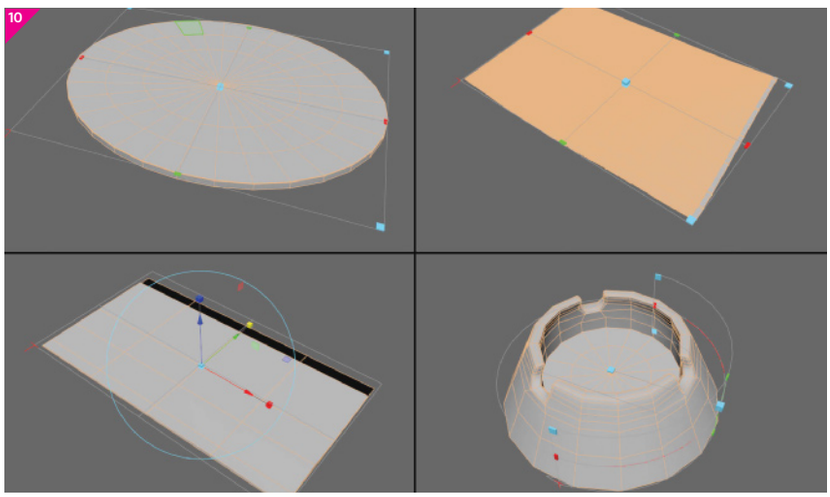
07 Table cover Start with a simple cube, stretch it, give it a few subdivisions and bevel the outer edges. Slightly offset vertices along the length just to give it a little random look. Duplicate this cube ten times and offset vertexes on the duplicates. Now group all of the geometry, duplicate it and move it on the side of the first set of cubes. Offset more vertices, just to make the second set different from the first. Repeat this technique until you have the entire table covered. For the white ropes (boxes 4 to 9 in the screenshot) we used a simple plane and offset every other face on the z axis so it better matched the geometry from previous steps and gave it a hint of extrusion. Duplicate a few times to get a longer piece. Merge all pieces, duplicate and rotate for 180 degrees so you cover both sides of the table cover. Use the Lattice tool to better match ropes with the table cover. It looks like bad geometry, but when you press smooth preview everything will look good.

08 Additional models The additional models in the scene are models that are used to fill in the space. All of them are just basic geometry modelled really quickly with basic tools like Extrude and Bevel. In the final concept most of these models are blurry in heavy depth of field, so don't put much work into them. We added a particle system on the top of the table using Emit from object command in the nParticles menu. This will be used to simulate dust on the top of the table.



09 Use UVLayout For the UV maps we are going to use UVLayout. We are not going to do UVs for all objects, just the 'hero' objects that have a unique texture. Using UVLayout, unwrap UVs for the big glass, small glass and a coffee cup. Not much work is needed here; using tools like Slice, Cut and Weld you can get a good result quickly. Just make sure to make your seams as invisible as possible – try to put all of the visible seams on the back side of the objects.



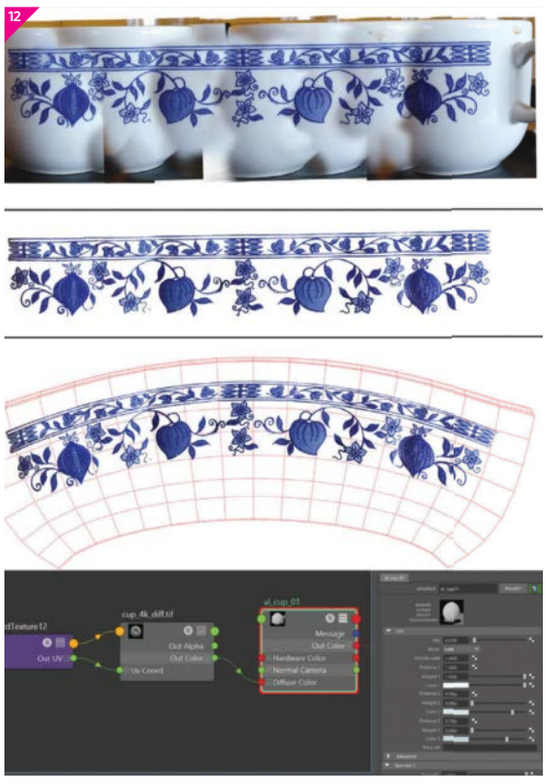


10 Finish UVs For other objects in the scene use just basic planar or cylindrical UV maps. By working this way you can get quick UV maps for the objects in your scene that are not so important as your primary objects. If you find errors in your UVs you can always use Maya's UV Lattice tool to fix problems.

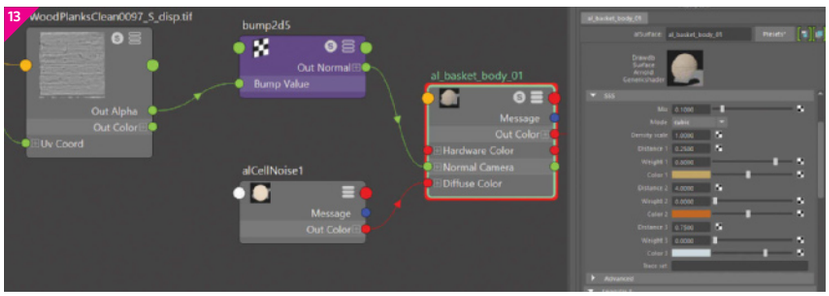
Importance of scale

The scale of the scene is a really important factor during artwork creation. Physically based render engines, like Arnold, are really dependent on scene scale. Always model everything in real-world scale. Before you start to model anything, Google the approximate size of the objects that you are going to model. In the case of the Coffee Table, I had real objects in my room, so I took the tape measure and wrote down sizes of all objects on the scene.

11 Shade the glass Download some smudge and dirt textures from the internet and import them into Photoshop. Place them randomly across the UV snapshot to create a smudge map. Go back to Maya, assign alSurface to the big glass and plug smudge map in Transmission Strength. Put a remapHSV node between the image and shader slot and use IPR to preview the result. By changing the value graph on the remapHSV node you can change the intensity of the effect. You can further develop the shader by plugging the same or inverted smudge map into different shader slots. When you are satisfied with the result, add a logo to the glass. In the picture you can see the texture maps and the shader network we created for the big glass. Use the same technique for a shader for the small glass. Make sure to name the nodes correctly as it will be easier to work with everything so organised.



12 Shade the cup For the cup shader, we are going to take a slightly different approach. First, we are going to align our reference photos in Photoshop so we can extract the ornaments on the side of the cup. Then, using Photoshop selection tools, extract the blue texture pattern. With the help of Levels and Hue/Saturation adjustments fix the uneven parts of the texture. After you have achieved the pleasing result, just align the texture with the UV snapshot from Maya. In Maya, plug this texture in the diffuse colour shader slot and give it just a hint of a blue-ish subsurface scatter. This will improve shading of the cup in the final render.

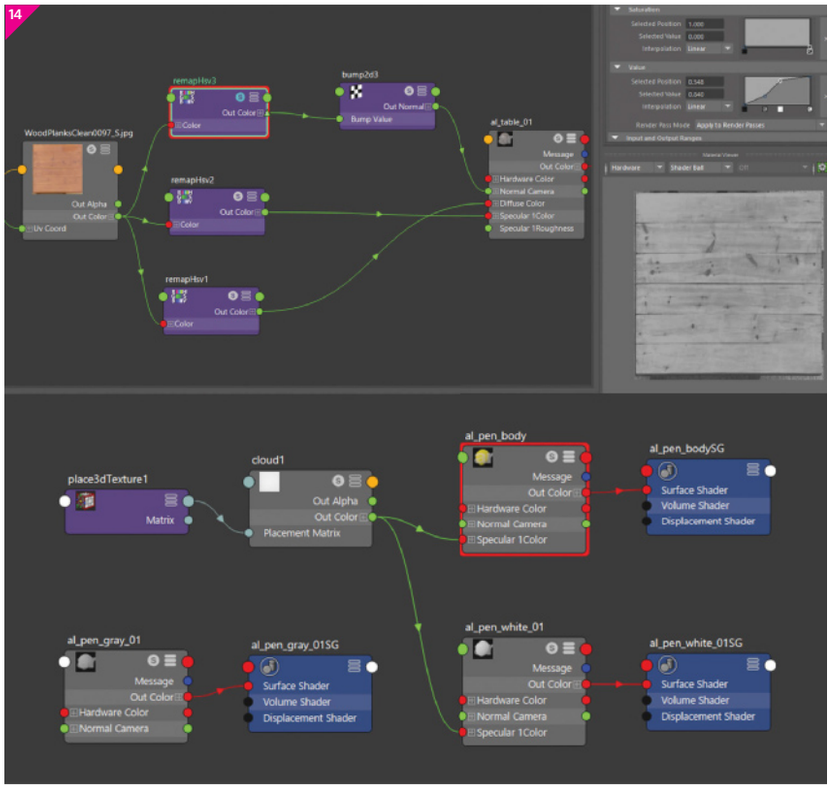


13 Shade a basket Because the basket has a heavy depth-of-field effect, we are going to make a pretty simple shader. For the diffuse colour we are going to use alCellNoise and give it an orange/brown colour, but without strong saturation. After that, just use any wood texture from CG Textures as a Bump map, just to give it some variation. The last thing is to add an orange subsurface scatter to the shader. The basket is made from very thin wood slices, so we can use subsurface scatter to achieve better shading.

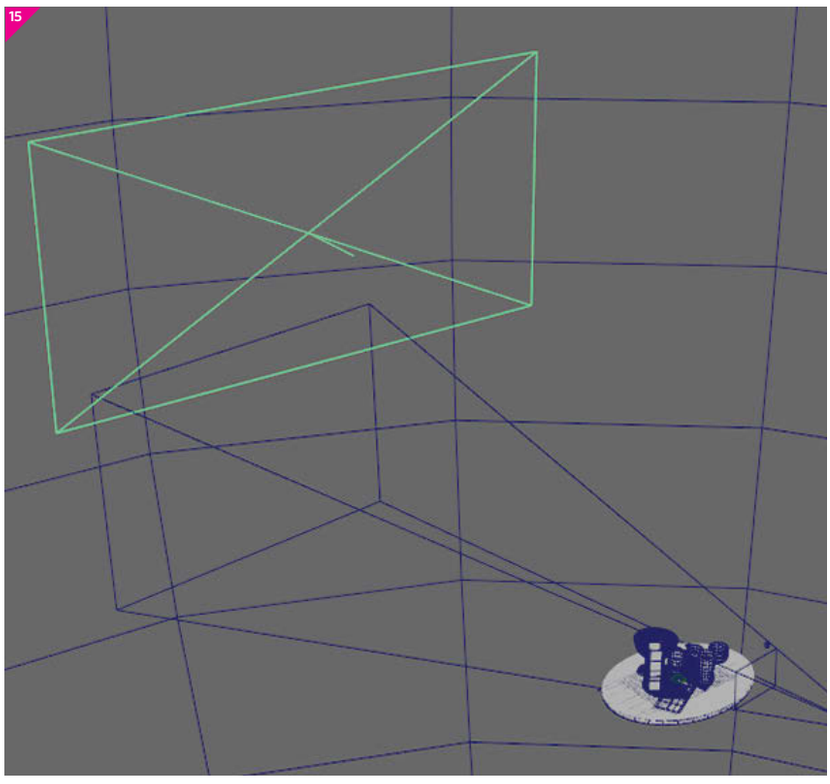
14 Other shaders Because shaders for our 'hero' objects are finished, we are going to make some simple shaders. In the picture you can see shaders for the table and the pen. For the table we used just one wood texture downloaded from **cgtextures.com**. Using remapHSV utility nodes we changed value and saturation for one texture to create Diffuse, Specular and Bump maps. This is a quick way to create all other maps just from one image and the pen shader is even simpler. We used a procedural cloud texture and plugged it into a specular colour shader slot, just to break specular reflections a little bit. Then just set the diffuse colour to the colour that you like. All other objects in the scene are shaded using the same techniques.

Utility nodes

Maya has a good selection of utility nodes and you can use a lot of them to do quick texture fixes. RemapHSV can be used to control Hue, Saturation and Value parameters without you having to return to Photoshop to fix the same parameters and exporting textures again. Reverse can be used to invert the values or colours of a texture. Also you can use utility nodes and procedural textures from the alShader to improve your procedural shading workflow.



15 Light the scene For this particular scene we are going to use a combination of an Arnold Skydome light and an Arnold area light. We will use Skydome for ambient lightning and reflections and area light will be used as our main scene light. Plug a good HDR image in the Skydome colour slot to achieve good reflections on reflective objects. This is really important for our 'hero' objects, since glass is really reflective the realism of the glass shaders will be dependent on the Skydome image. For area light just check 'Use color temperature' in the Arnold tab, and set the value to around 6,000K.



Showcase

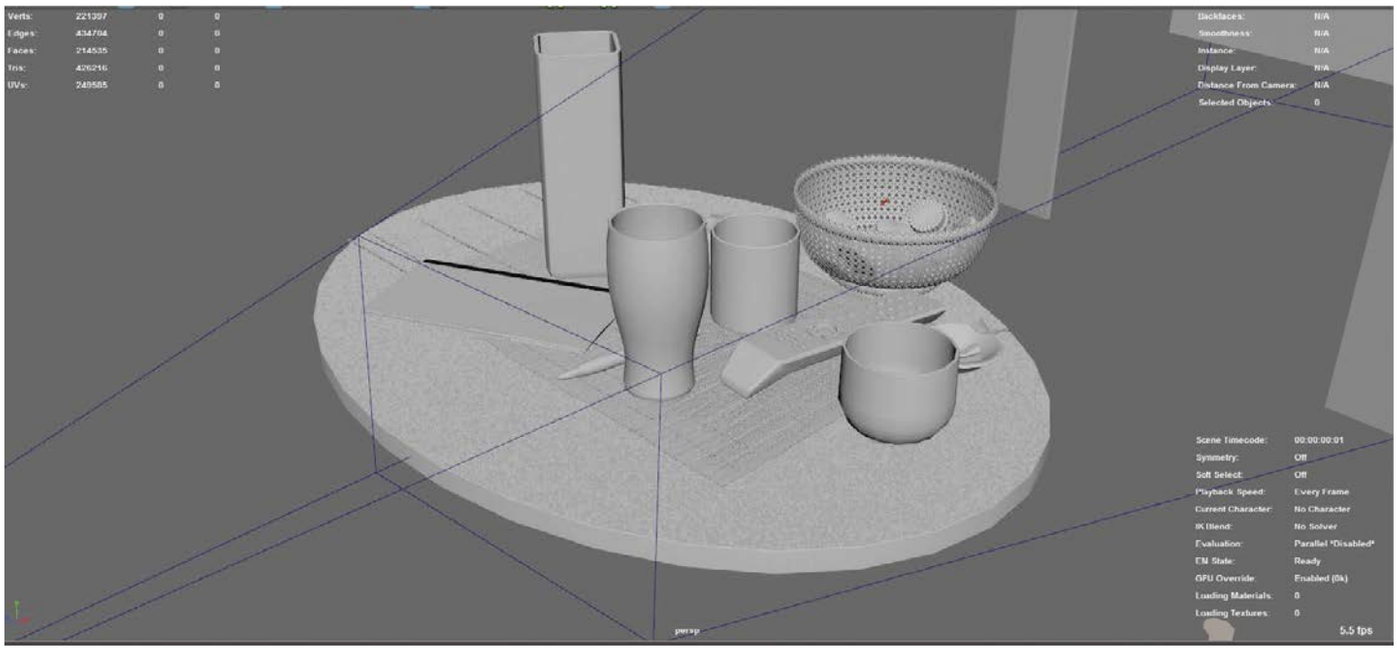
Dušan Ković

I am a computer graphics generalist currently employed by Eipix Entertainment as a lead animator in the cinematic department. Since I was a child I was fascinated with computer games and sci-fi movies which led to my interest in realistic 3D-generated images and movies. I'm working on my skills all the time, constantly trying to push them to the next level.

Piggy, **Maya, Arnold, Mudbox, Photoshop (2015)**
This is the first time I tried Agisoft Photoscan. I was pretty pleased with the results. Later I painted textures in Mudbox and rendered the artwork with Arnold.

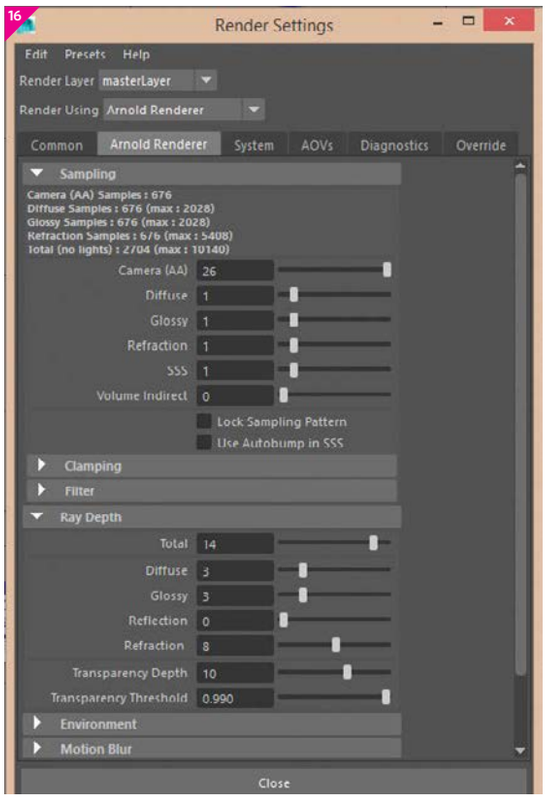
IS3 Heavy tank - WIP, **Maya, Arnold, Photoshop (2014)**
Inspired by a spontaneous idea that made its way into my consciousness on a random day.

Polycount's hard surface challenge, **Maya, Arnold, Photoshop (2014)**
This is a piece of artwork that I did for a hard-surface challenge on a Polycount forum. It is one of my first experiments with realistic glass shaders.



16 Render settings Instead of doing depth of field in post-production, we decided to use a really high AA value in the render settings of around 26. This is necessary when rendering depth of field and motion blur. Because of the high AA sample value, all other samples were set to 1. When setting depth-of-field distance you can use Maya's Distance tool to find a good distance between the camera and the objects in focus. For Ray Depth we used a value of 3 for the Diffuse and Glossy rays and a value of 8 for Refraction because of the refractive objects in the scene. Also we are going to set up AOVs so we can use multiple passes to have more control in post-production.

16



17

17 Post-production As we achieved a really good result from rendering we are not going to use multipass compositing. Instead, we are going to alter the beauty pass. Using Levels, Hue/Saturation, Photo Filters and Color Balance adjustment layers you can quickly edit the beauty pass to achieve a more pleasing result and enhance the image. In the end we added a little lens dust and added a few background elements from our original concept. There was not much work in post-production, because we achieved a great result in render. In the picture you can see the comparison between the beauty pass and the final image.

> "Set up AOVs so we can use multiple passes"

Download alShaders

AIShaders is an additional production-oriented shader pack for Arnold renderer created by Anders Langlands. It contains shaders, procedural textures and utility nodes which can greatly improve your workflow and cut down render times. They are similar to standard Arnold shaders, so you will be using them pretty quickly. They are free for use and you can download them at this URL: **anderslanglands.com/alshaders/index.html**.

All tutorial files can be downloaded from: **filesilo.co.uk/3dartist**

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Software

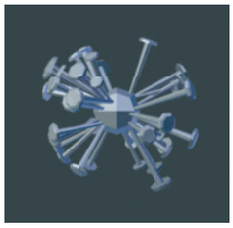
Blender, Cycles

Learn how to

- Create believable materials using Cycles nodes
- Generate texture maps using Bitmap2Material
- Combine traditional and PBR workflows in Blender
- Improve the level of realism via Compositing nodes
- Use Blender's ParticleSystem to distribute objects

Concept

This piece is a depiction of one of the most discomforting emotions of all – one that can break down even the toughest of composures. Inspired visually by Joey Camacho's and Greyscalegorilla's pieces.



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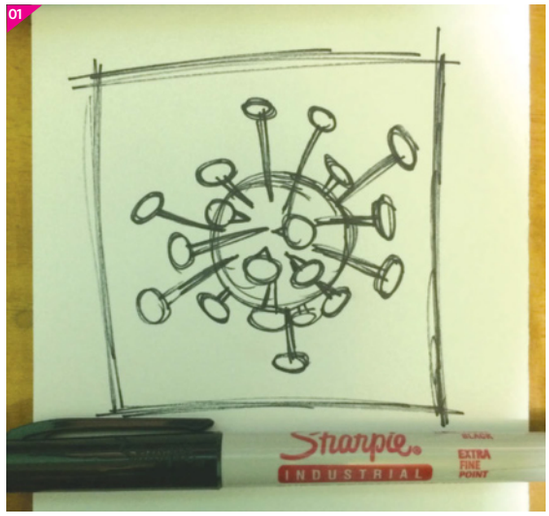
- Scene files
- Tutorial images
- Breakdown video

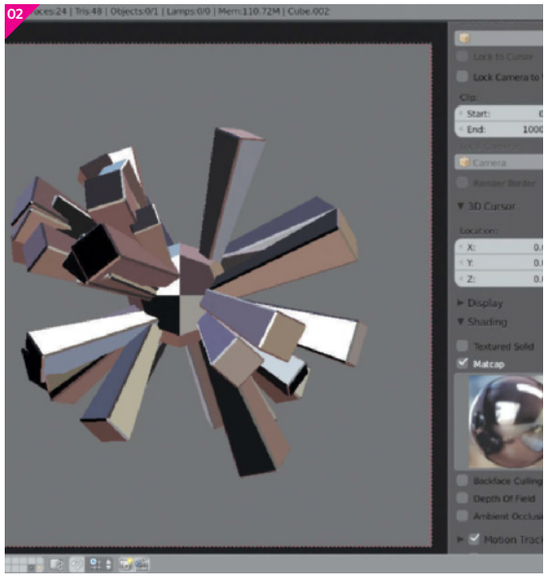
Create abstract art with Blender

Design abstract renders with Blender's ParticleSystem and Cycles, visually inspired by Joey Camacho and Greyscalegorilla

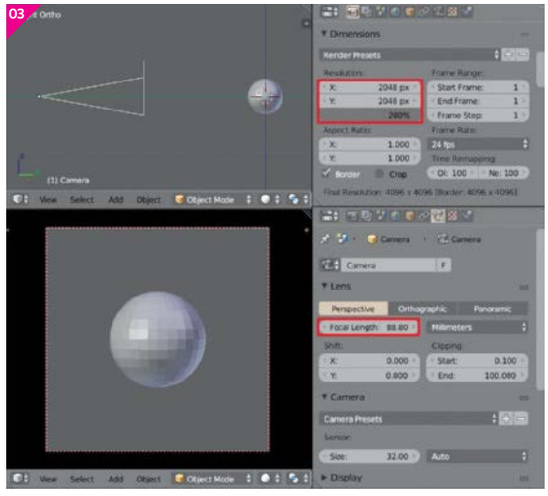
This tutorial will show you how to create an abstract artwork with Blender utilising the powerful ParticleSystem. We'll be walking you through the entire creation process – from the early modelling to the final postprocessing work. Although Blender's node system is capable of utilising a single image texture and generating the various maps, we decided to use Allegorithmic's Bitmap2Material to generate these maps – having full control over the resulting map and subsequently feeding these images into Blender's node system. You will also be guided on how to combine a traditional shading approach with a PBR one. At the end of this tutorial, you will have a broad knowledge of how Blender's Compositing nodes work and will be confident enough to create a scene yourself.

01 Sketch the idea We often get so carried away with our grandiose idea that we forget to lay down the basic principles of design and to actually materialise this idea. The most practical way to do this is still drawing on paper – traditionally. There's a certain mental process and a psychological backing as to how sketching our ideas can fuel the succeeding processes that will be involved. This step will also enable you to get a glimpse of what it is that you have thought of. One advantage to this approach, too, is that you have a solid reference of it and it won't be subject to being forgotten and lost.





02 Experiment Now that you have the solid sketch in hand, it's time to test it with your basic tools. This will give you a further sense of where your work is leading to. At this stage, you can block out your scene using basic geometric shapes with basic colours, just to get a feel of the entire thing. As soon as you do this, you'll be able to determine whether this idea is worth pursuing or not; you'll be able to foresee a couple of technical issues that you might not have known and would have a solution to. During this stage, Blender's Matcap feature is an indispensable aid.



03 Set the stage As soon as we have everything in place and we've determined some variables that need to be considered for the work, it's time to prepare the scene. In Blender, we can go ahead and add a simple sphere as a reference to the main object. We'll also add a camera and adjust its settings (field of view, dimensions and so on.).

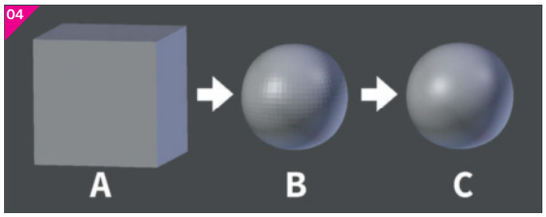
“By creating additional variations of nails (bent, flattened and so on), we imbibe a sense of emotion that is more thought-provoking”

04 Model the centre This is probably the most elementary step that we'll dive in to, but it's one that we have to pay careful attention to. Since we wanted to create a somewhat uniform distribution of objects later, it's best to start off with a cube which has equally faceted features. Afterwards, simply add a Subsurf Modifier and set the shading to Smooth.

05 Model the nail After referencing some nail photos online, the decision was made to create a rather simplistic model. This will be the main element of the scene and much of the visual quality will come from the materials and textures, however, it's worth noting that the form must at least be readable. Start off with an eight-sided circle, creating extrusions and loop cuts until the desired shape is achieved.

06 Create nail variations Having only one look for the nail distributed along the surface of the sphere would look bland and ordinary. We want to create something that has more character and story to it. By creating additional variations of nails (bent, flattened and so on), we imbibe a sense of emotion that is more thought-provoking. To do this, we simply have to select portions of the mesh and perform rotation and scale operations.

04



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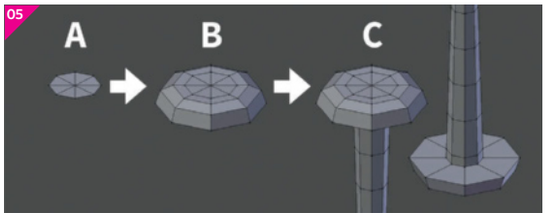

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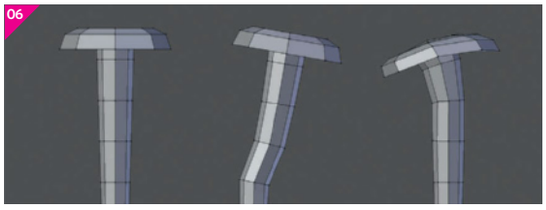
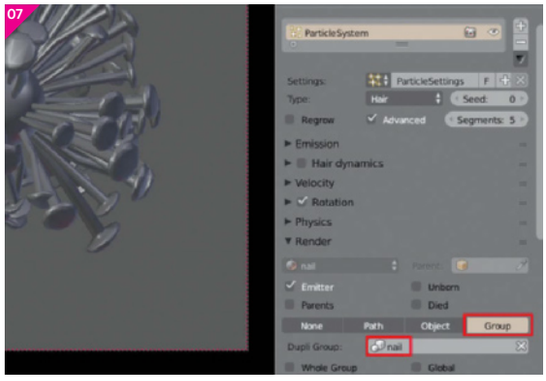


One step at a time

Whatever your medium, it is crucial to spend some time jotting down ideas and listing notes – a data dump as it is often called. It is also worth mentioning to pace yourself when doing projects like this, since it can be very tempting to jump straight in, then eventually lose sight of what's more important. It's best to gradually progress and take time to take in the essential steps until you finally get to the final piece.

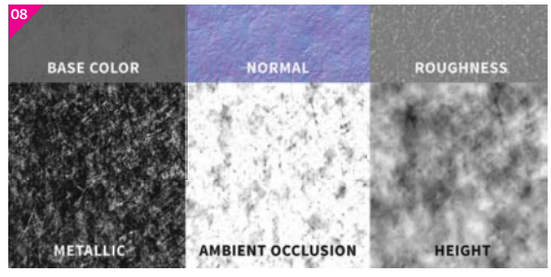
07 Instance the nails Now comes the fun part – distributing the nails along the surface of the sphere. Select all the nail variations and create a Group. Using Blender's ParticleSystem, specify the nails as the DupliGroup and voila, you now have a fine distribution of the nails. However, we will fix the mesh intersections later on.

07



08 Create texture maps The metal and rust textures that were used as base images were from **cgtextures.com**. Using Allegorithmic's Bitmap2Material, generate the following maps: Ambient Occlusion, Base Color, Height, Metallic, Normal and Roughness. These textures will then be fed into Blender to combine a traditional shading approach and a PBR workflow for more realistic material behaviour. On generating the Normal maps, make sure that you have inverted the relief and exported it separately, since Cycles interprets this as the correct one.

08



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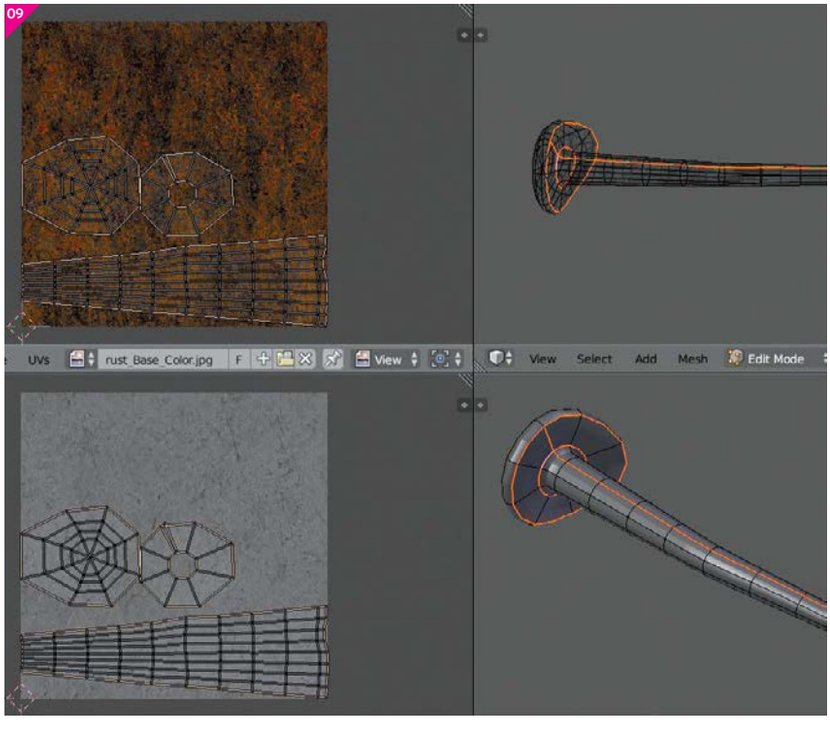
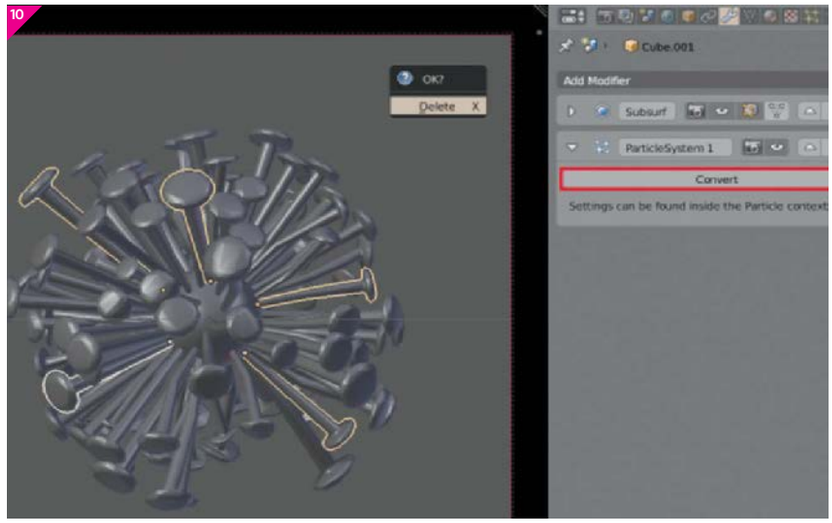


09 UV unwraps Creating the UV maps for the nails is fairly easy. Create UV seams along the corners of the nail object that cuts it in half, all the way to the tip and perform a simple UV unwrap operation. You can now tweak the faces of the UV map so that they're almost identical in ratio, but for simplicity purposes the generated map will work just fine.

The devil is in the detail

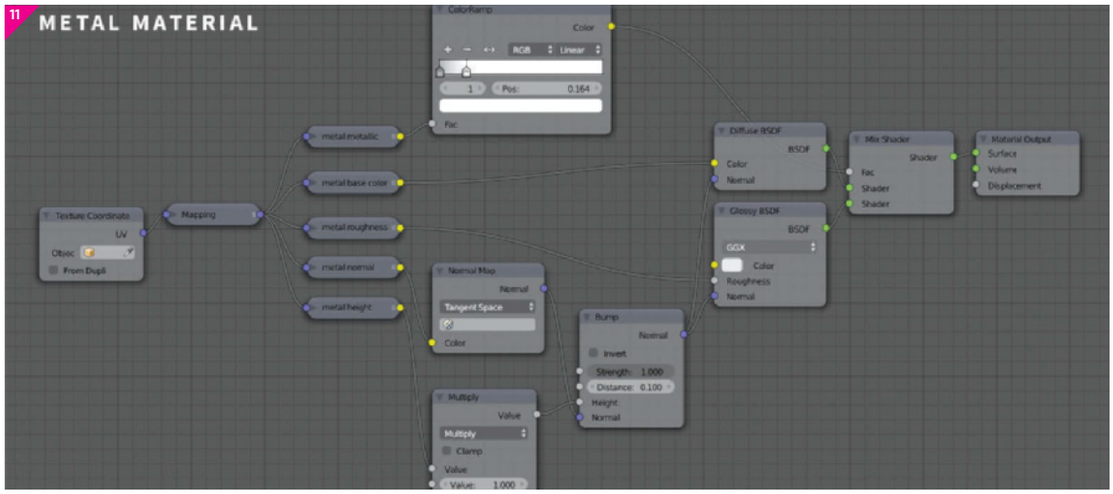
As with most artwork we create, we usually take the tiny details that make up an object, scene and/or environment for granted. However, this can create a huge impact, although this may be subconscious at times. Pay attention to these minuscule details and you'll reap the benefits later. Often, these are the aspects of your creation that will determine how believable it will be and how your viewers will be captivated.

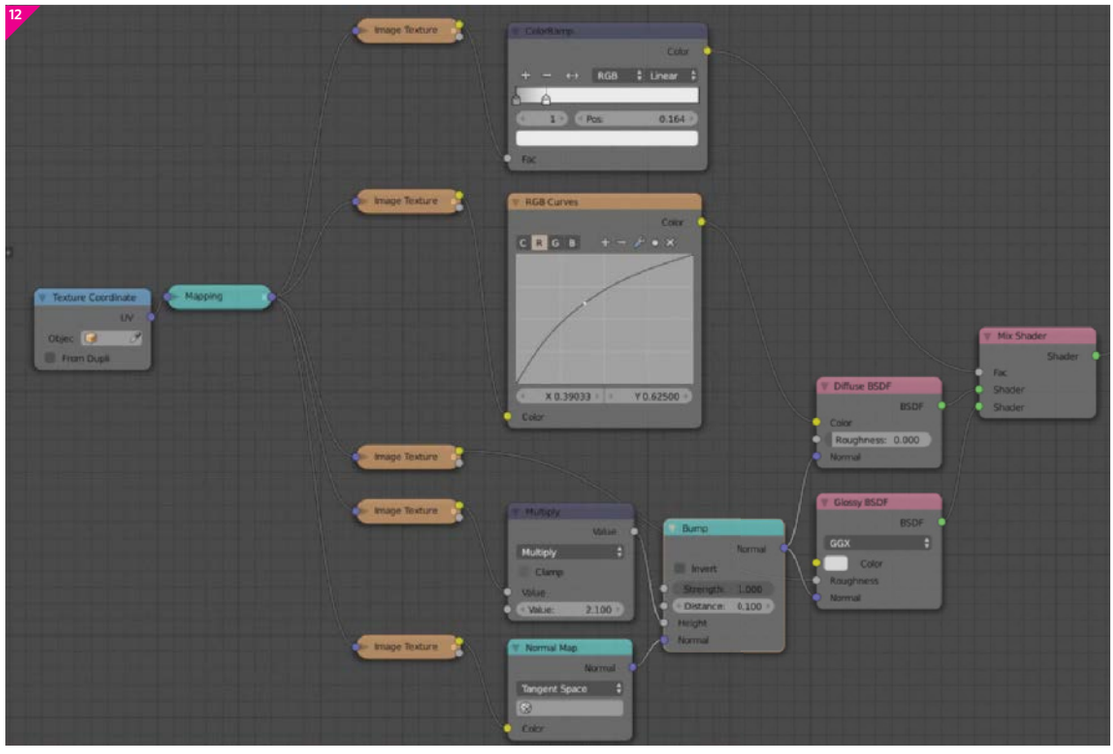
10 Edit the nails distribution In Step 7, we encountered a mesh intersection issue and to fix this, we need to convert the nail instances into real objects. This will then enable us to tweak the spacing of the nails and delete those that aren't needed. Depending on the number of object instances that you have, this can become a cumbersome process, but the results you will reap will be greater, creating a more convincing and realistic output.



11 Create the metal material Utilising the texture maps that have been created in one of the previous steps, we then use Blender's Material nodes to generate the final shaders and material. To utilise both the Normal map and the Height map at the same time, we can make use of the Blender's Bump Node to combine them, adjusting the strength value as necessary. Unlike the traditional approach to material creation in Blender, this setup makes use of the texture maps to generate a PBR material.

12 Create the rust material The rust material is pretty much the same in concept with the metal material – from the texture map generation in Bitmap2Material to the node layout in Blender. However, they differ in the strength of the Normal map and the Height map to exaggerate the wear-and-tear effect on the nails. Once you've done that, combine the metal and rust material using a Noise texture as a blending factor between the two materials.

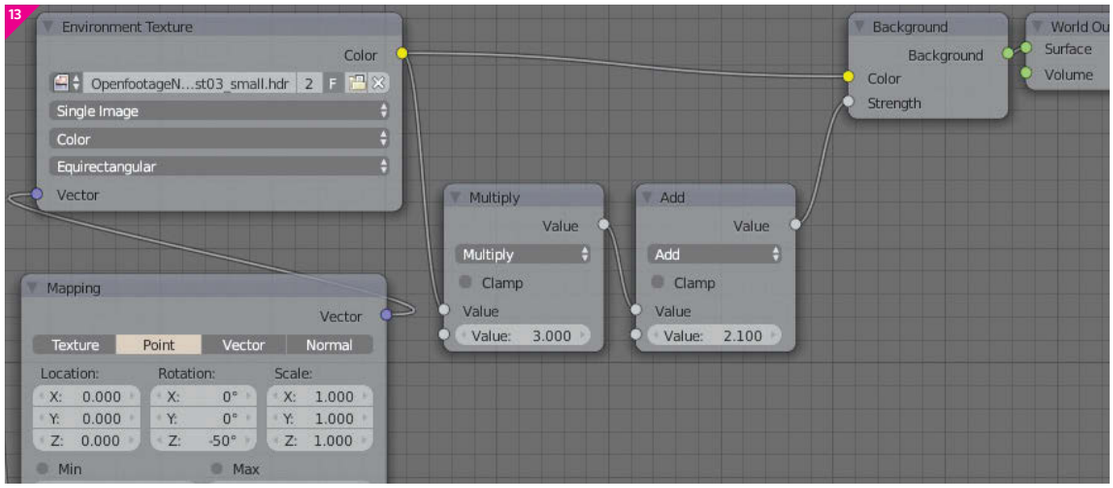




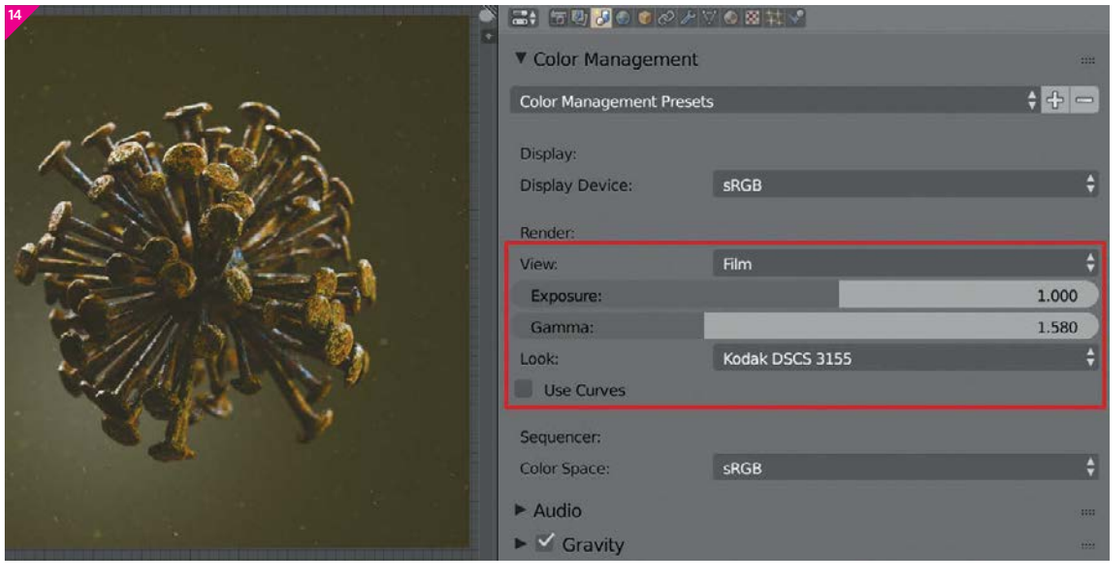
Imperfections are your friend

Compared to real life, photographers often rule out imperfections in their shots – they try to get the smoothest possible surface to portray a clean space and architecture, for example. However, as CG artists, we tend to do otherwise. Since it's our task to achieve believability in our scenes, we try to add these tiny imperfections to portray a lived-in space and add a touch of human interaction to our scenes, thereby giving clues that it might be real.

13 Environment lighting Lighting played a huge role in exaggerating and adding detail to the rather simple subject. There's always the option of creating additional lamps and mesh lights as needed, however, if IBL (image-based lighting) works by itself, then you should go for it – and this is what was done for this project. Using an HDR texture, the tone and variation in colour has been added by tweaking the rotation and orientation of the image. In addition to this, several nodes were also added to control how much contrast and overall fill lighting the scene has.



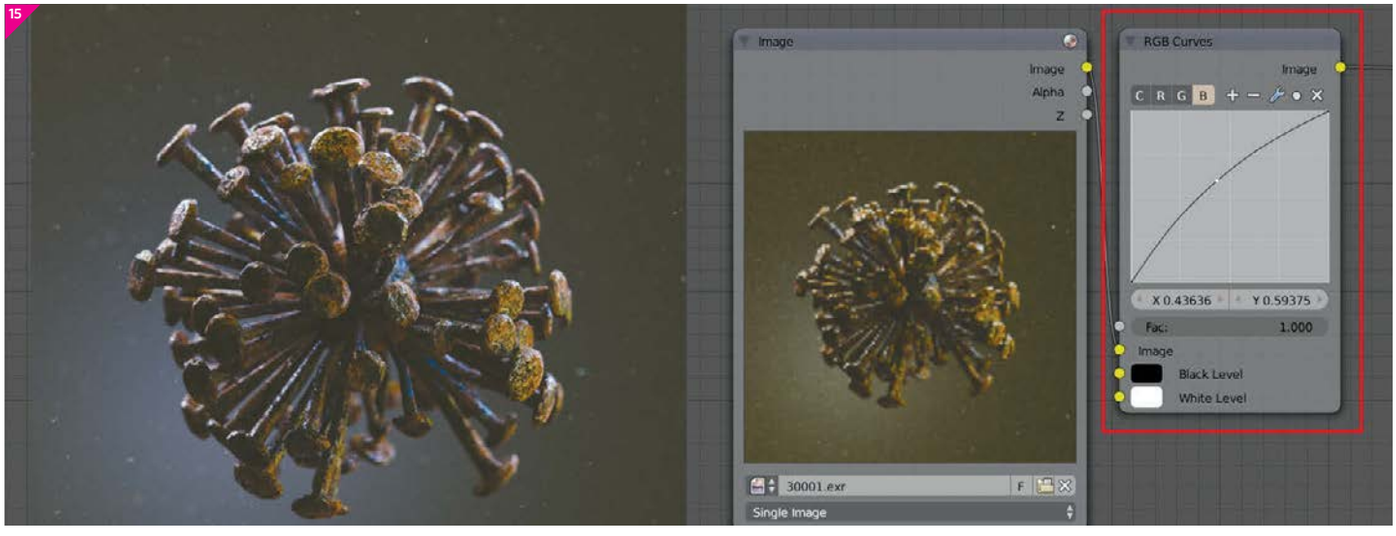
14 Film emulation As an initial step of the postprocessing stage, we'll be adding a film emulation effect to the render. However, by default, it creates a rather dark image; to counter this simply adjust the Gamma and Exposure values until the render is well exposed. You also have the option to choose from a variety of film looks, as well as creating your own from Color Curves.

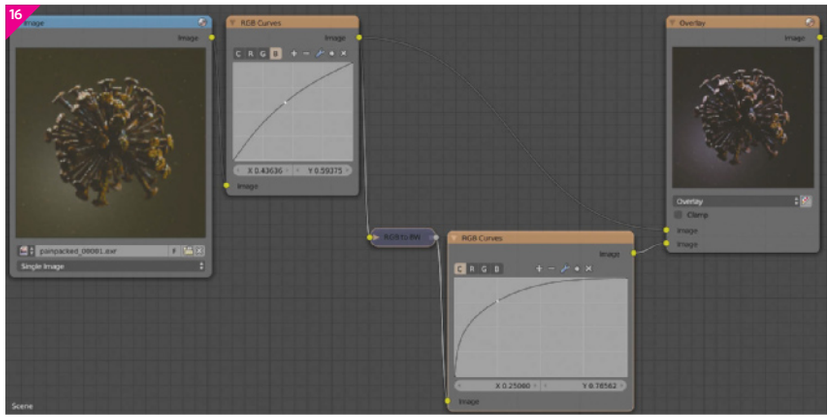


15 Colour correction Using the Film Looks option can sometimes create strong colour casts, so to counter this we will add Blender's colour nodes to balance the image. We'll use a simple Color Curves node and adjust the blue channel to reduce the amount of yellow in the render. By doing so, we add a tint of cold blue that equalises the overall colour harmony.

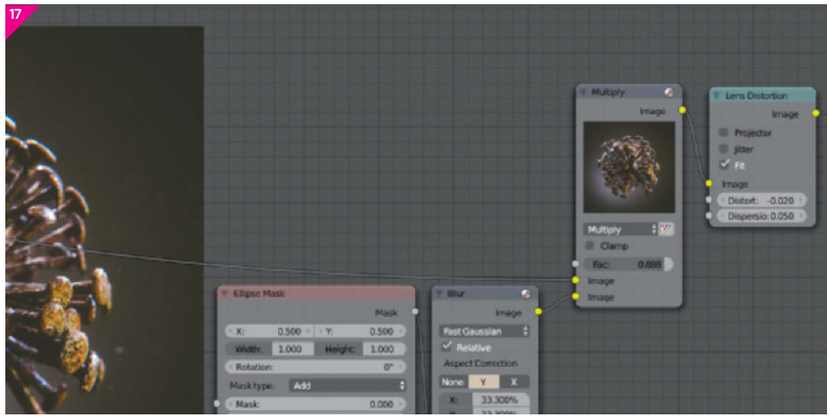
The simpler, the better

You can go crazy with the postprocessing stage of the production and add a humongous network of nodes. However, if you can compress an effect in a few iterations then you've just saved yourself a lot of time and processing load in the long run. Think smart.

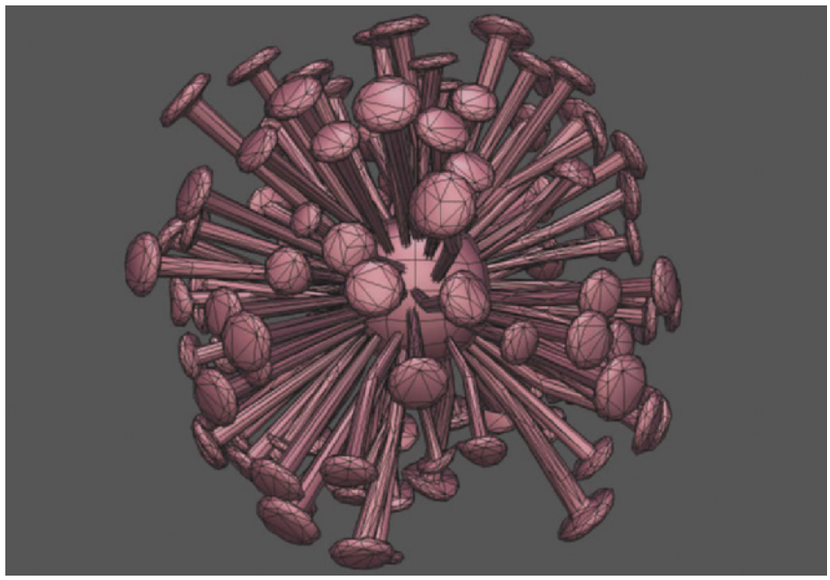




16 Colour grading This step involves adding certain colour moods to further express the emotion behind your scene and story. There are a lot of colour nodes you have at your disposal that you can use, the most common one being the Color Curve node. Colour grading is essentially the process of altering and enhancing the colours of your render. For example, if you want to create a cold and evening look to your render, you might lean towards adding a blu-ish tint to it; a strong and warm tint on the other hand is achieved by adding oranges and reds. The sky's the limit with colour grading but, as always, keep it balanced and easy on the eyes.



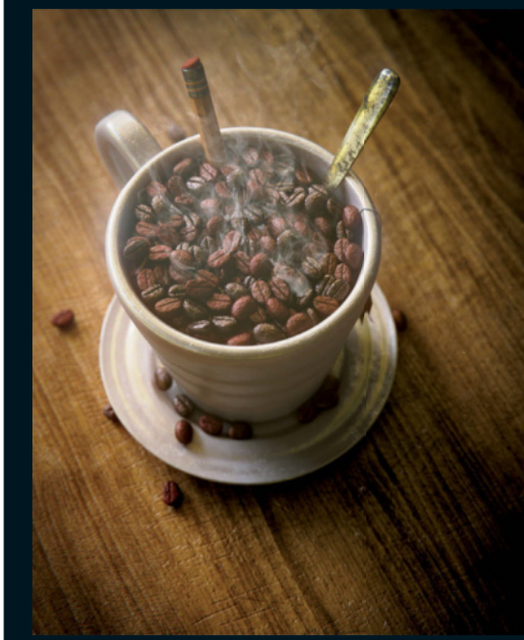
17 Lens distortion To imitate the effects of a low-quality telephoto lens, we'll be utilising Blender's Lens Distortion nodes. We will also be adding a vignette effect to further accentuate this imperfection. By doing so, we are suggesting a natural effect to our viewers which will eventually make them believe it exists, even just subconsciously.



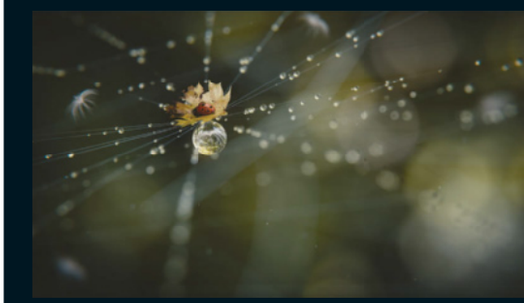
Showcase

Reynante M Martinez

As a self-taught artist and a Blender user for 11 years, Reynante specialises in visual storytelling and lighting, with industry experiences that include everything from academic teaching and art direction for short films to architectural visualisation.



***Burnout*, Blender, Cycles (2015)**
Inspired by those moments when we're at our limit – when we want to give up but we can't.



***Stigma*, Blender, Cycles (2015)**
A depiction of risks, anxiety and norms.

***Relativity*, Blender, Cycles (2015)**
This is my tribute to one of the most compelling and equivocal facts of the cosmos – relativity.

Technique focus

Incredible 3D artists take us behind their artwork

LIGHTING The lighting was carefully approached to best explore the volumes of the house and also convey a quiet and cozy atmosphere. This was achieved by using a VRay Dome Light, an HDRI and V-Ray planes and spheres inside the house. Adjustments to layers and layers with blending modes in Photoshop reinforced the shaded areas and highlighted the lights.

Ricardo Canton
ricanton.cgsociety.org

3DArtistOnline username
Ricardo Canton

Software
AutoCAD, 3ds Max, V-Ray, MultiScatter, Photoshop, Magic Bullet PhotoLooks

Itatiba House, 2013

Lenovo® recommends Windows.

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Our experts

The best artists from around the world reveal specific CG techniques

Houdini

Carlos Parmentier
carlosparmentier.com

Carlos is an FX TD and a high poly/low poly modelling artist. He loves to work with fluids and destruction

3ds Max

Paul Hatton
cadesignservices.co.uk

Paul leads a studio in England specialising in creating beautiful and interactive videos and environments

ZBrush

Daniel Orive
danielorive.com

A character and concept artist, Daniel's latest work can be found in games like *Disney Infinity 2*

Maya, V-Ray

Tashina van Zwam
framecandy.nl

As a 3D artist for MediaMonks, Tashina's work mostly focuses on shading, lighting and texturing

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**

- Reference images
- Scene files
- Tutorial images

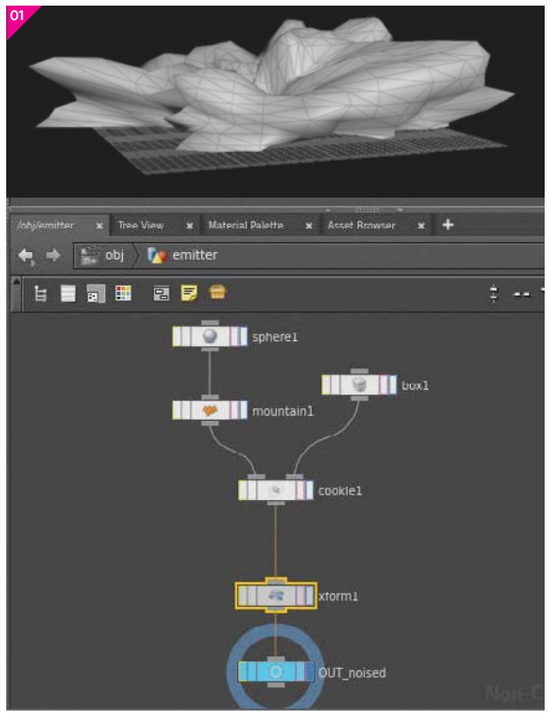
HOUDINI

Set up a huge pyro explosion in Houdini

Whenever we want to make a good FX explosion, we should start with detail and realism, and this can be obtained from good references. You can create an explosion like this with knowing just the basics of Houdini. The most important thing for this tutorial is to keep doing different styles of explosion and get used to doing them too, as this process will improve every scene that you create.

This huge hangar explosion is made by starting the destruction of hangar. The hangar was inspired in part by watching the film *Empire Of The Sun*, and after that we've created the explosions layers as correct to their real size as possible for a good result, as we explain later in the tutorial, and then rendered with mantra PBR.

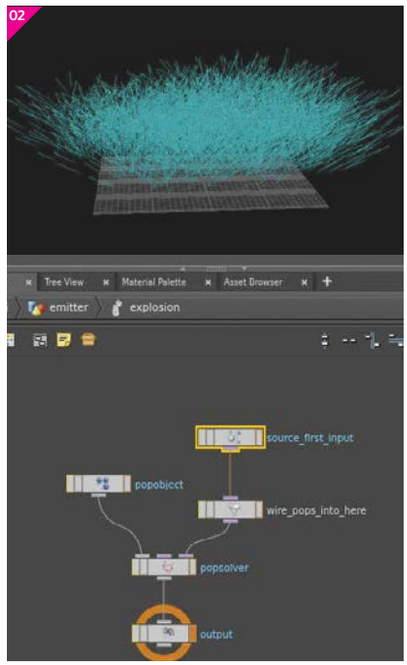
01 Create the model Since this is a new scene, we will now need to add a geometry node and then delete it from within. Next, we will then create a model with noise for the emitter of the explosion. Let's start by creating a sphere that we will set as a polygon mesh, with the row and the columns set to 30. Add the sphere node mountain to be noise deformed and then cut it in half using the node cookie with a box from the floor downwards. This will leave only the noised model positioned above ground. Next we will add the Transform node with a scale of 2, 1 and 2. Finally we will add and call the Null node 'OUT_ noised' to make an easy path.

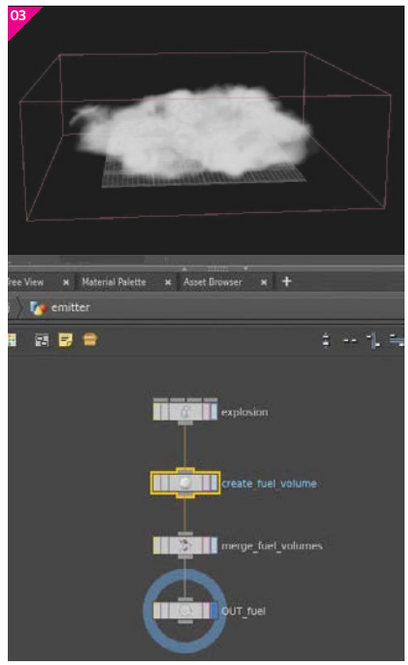


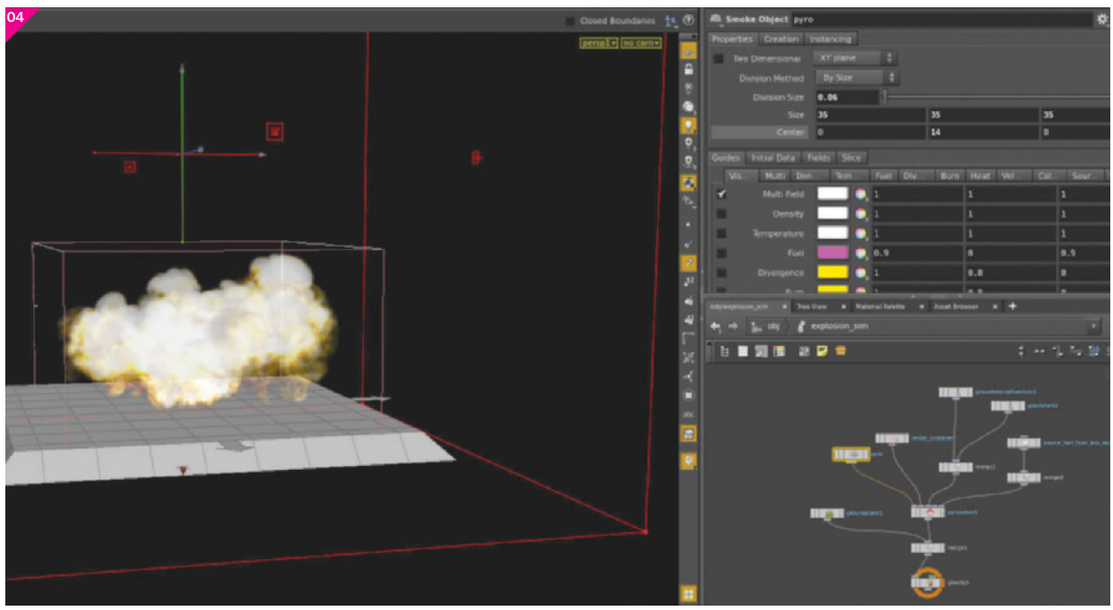
02 The Birth operator Before making the Popnet better we need to create a pyro, so create a box and click Explosion in the Pyro FX tab. Now we can create a Popnet inside the box geometry, we can then go in to Popnet to configure it. In Pop source we select the same path in SOP as we did in Pop, for example: obj/emitter/OUT_noised. In Attributes we choose Set Initial Velocity under Initial Velocity and we set Velocity to 0, 6 and 0, and in Variance we set the values as 12, 2 and 12. Now we have to make particles die or we will have an infinite explosion. In Birth we can animate the Const. Birth Rate by setting frames 1 to 3 as 100,000 and setting frame 4 as 0, or you can just type 'if($F<3, 100000, 0)'. In the Life Expectancy we set the value as 0.15 and the Life Variance is set as 0.1. Now you can play around and see how the particles look.

03 Work with Fluid Source Rename Popnet to 'explosion' if you want and connect 'create_fuel_volume' to the Fluid Source node. Erase the box now as it's no longer of use. In Fluid Source set Method as Stamp Points to function with Popnet particles. Animate the fuel scale to stop it emitting fuel. Add a keyframe at 120 set as 1, frame 140 set as 0 and Stamp Points set as 0.3, the rest we leave as default.

04 Configure the pyro First change the name of the DOP network to 'explosion_sim' and config the Pyro Solver starting with the Simulation tab, where we set the Temperature Diffusion to 0.05 and Buoyancy Lift to 2.75. We leave the Combustion tab as it is but you can change it to suit your needs. In the Shape tab set the Dissipation to 0.035 (to make the smoke last), the Shredding to 1, Turbulence to 1. Also in the Turbulence tab, set the Swirl Size to 0.85, Grain to 0.55 and Turbulence to 3. If you have a good, up-to-date PC you can activate the OpenGL in the Advanced tab for faster simulation. Now we will add some extras in the Velocity Input from Pyro Solver and add Gas Vortex Confinement to make small swirls. Let's leave the Confinement Scale at 5. Now add the Gas Disturbance and set the Disturbance to 4. Add the Merge and connect the Gas Vortex Confinement and Gas Disturb to the Merge, then connect the Merge to the Velocity Update input of the Pyro Solver. For the Gas Resize Fluid Dynamic (resize_container) we increase Padding to 0.6 and in Max Bounds tab we deactivate the Clamp to Maximum Size. Now let's add the Ground Plane for the explosion and don't let it go down over the floor – connect it to the merge as primary and make sure that it's in order. Then set the pyro detail in the Smoke Object as 'pyro'. The value for Division Size depends on what your PC can simulate – while the lowest value gives a more detailed explosion, a Division Size of 0.06 would be the most normal. Remember that you will need to set the correct size of the pyro container to that of the complete explosion, so set the Size as 35, 35 and 35 and the Center as 0, 16 and 0. Finally we will simulate the explosion, saving it as a BGEO formatt; the path in the pyro_import has the name changed to 'explosion_export'. In DOP I/O import_pyrofields, we set the path for where we will save the simulation of the explosion such as 'path/explosion/explosion.$F4.bgeo.sc'. Remember to put the frames in, and for this we will use 1 to 200f. Then we can simulate by simply clicking Render.







Extra hangar destruction

For the huge explosion, the first thing we did was model the hangar carefully for a stable destruction. Parts of the hangar are referenced from the movie *Empire Of The Sun* and we fractured them using a Voronoi Fracture. Also, we added constraints and glue for realistic destruction behaviour. For the explosion we used particles emitted like a bomb with copy spheres, then collided them with bullet-packed primitives. After we worked every piece with static objects, we set it as Use Deforming Geometry inside the Pyro DOP network.

> "Remember that you will need to set the correct size of the pyro container to that of the complete explosion"

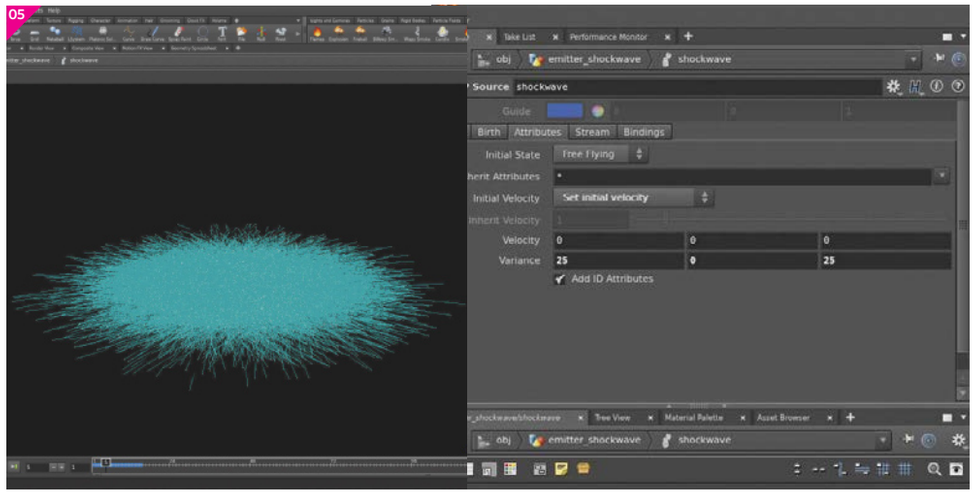
05 Prepare the shockwave

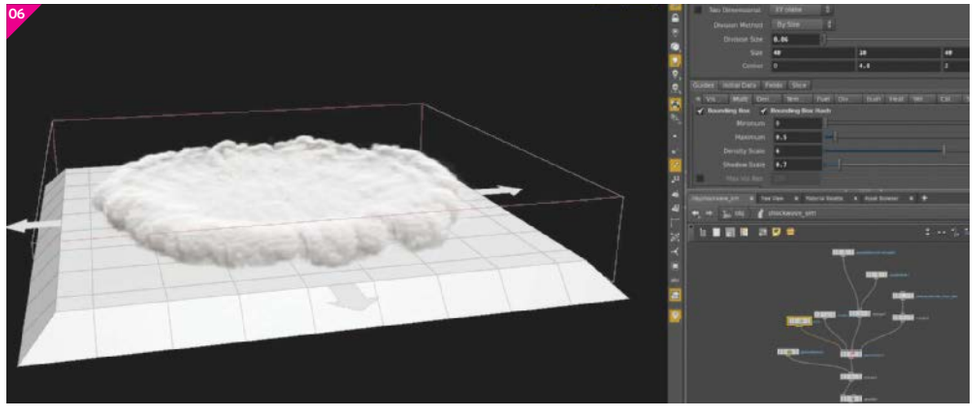
Now we duplicate the explosion emitter and change the name to 'emitter_shockwave'. Once inside the emitter_shockwave, change the name of Pop explosion to 'shockwave'. Normally we create a new pyro with Billowy Smoke but this time we will use an explosion, changing a few things such as the name of the node 'create_fuel_volume' to 'create_density_volume', and the source attribute to density instead of fuel. Also delete the fuel animation and change the name from 'fuel' to 'density'. Then we go on to duplicate the DOP network of the explosion, just like with shockwave we will need to set the Division Size of pyro as Relative Reference. The Division Size of Fluid Source can be the same value no matter what you change in the pyro. Now we get to the Pop network of shockwave, in the Pop source we change the name to 'shockwave'. The frames of Const. Birth Rate here would be 1 to 6 and set as 250,000, and the 7 is set as 0 or written like if($F<6,250000,0). The Life Expectancy is set to 0.3 and Life Variance set to 0.03. Now let's go to the Attributes tab, set the Velocity as 0, 0 and 0 and Variance as 25, 0 and 25.

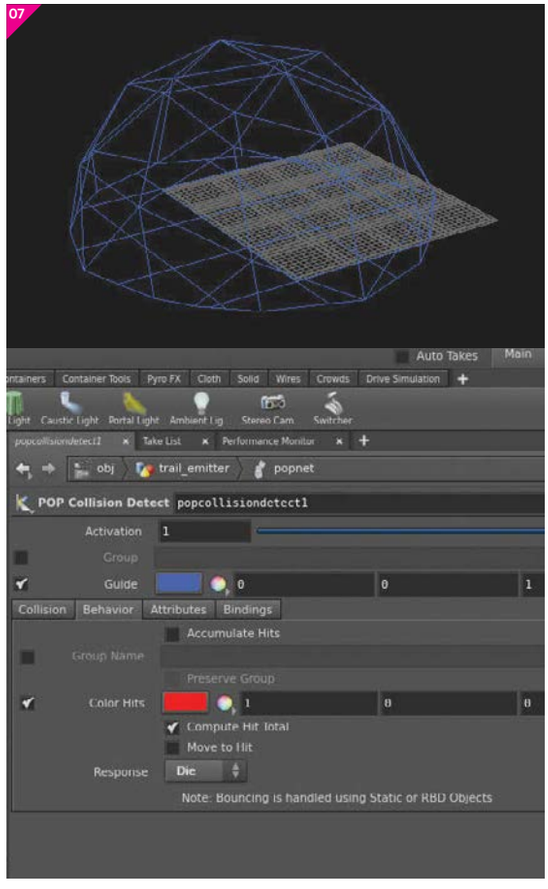
06 More configuration and smoke

Duplicate the DOP network of the explosion_sim and name it 'shockwave_sim'. Once inside, config the Pyro Solver and set the correct path in Source Volume to 'source_fuel_from_box_object1', for example: 'obj/emitter_shockwave/OUT_density' and change source fuel to source smoke. Now configure Pyro Solver in Simulation with Temperature Diffusion set to 0.2, Cooling Rate set as 0.75, Buoyancy Lift set to 5 and Buoyancy Dir set to 0, -0.15 and 0. In Combustion, deactivate Enable Combustion for when the shockwave is only smoke. In the Shape tab set Dissipation to 0.01, Shredding to 1 and Turbulence to 1 so that it's the same as the explosion setup and the rest is default. Now make the Size Container of the pyro wider, with Size as 40, 10 and 40, and Center as 0, 4.8 and 2. Keep the Division Size same as the explosion, but remember to copy Division Size to the emitter of Scalar Volume as Relative Reference as we are using it from explosion_sim. Now finish the config of DOP network and duplicate the explosion_export, changing the name to 'shockwave_explosion'. Change the path of the DOP I/O in DOP Network to /obj/shockwave_sim, DOP node to /obj/shockwave_sim/pyro and the path where we save the BGEOs.

> "Division Size of Fluid Source can be the same value no matter what you change in the pyro"







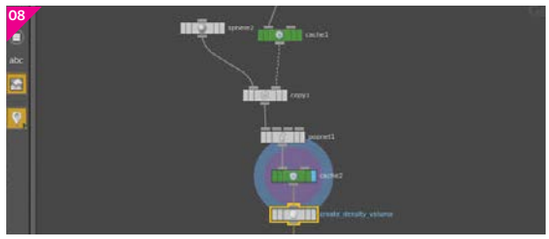
07 Work on the trails

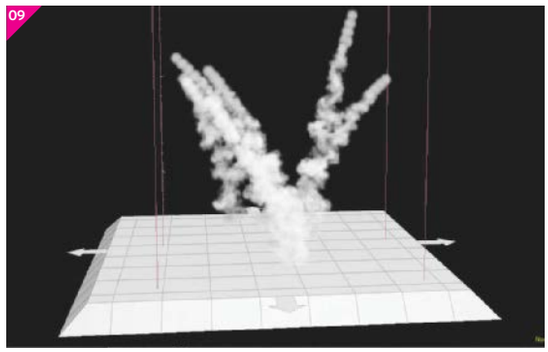
Duplicate the shockwave_emitter and name it 'trail_emitter'. Once inside delete everything until you get to just before Create_density_volume. Now let's make half a sphere for trail emission. The process for this is simple – just add a sphere, add a cookie (with a box from the floor down) to leave the half sphere facing upward. Then add a new Pop network to emit a few particles as trails that come from the half sphere. We also create one grid as a floor for the particles to die when they touch it. Now we connect it to the second input of the Pop network and configure the Pop network. Then, inside the Birth tab of the Pop source, the Const Birth Rate would be set to if($F<2,150,0). Now we configure the Velocity in the Attributes tab where the Initial Velocity is set as 'Set initial velocity', the Velocity set to 0,15 and 0 and the Variance set to 10, 5 and 10. Add Pop Collision Detect for deleting the particles when they collide with the grid by going to the Behavior tab and setting the Response as Die. Now let's get out of the Pop network. Next we add Cache node for automatically saving the simulation. Just click play and we get a few trails as particles. Now we add Copy with the sphere so that each particle is a sphere. In the sphere the Primitive Type must be set to Polygon Mesh and the Radius set as 0.1, 0.1 and 0.1. Now play to see it all.

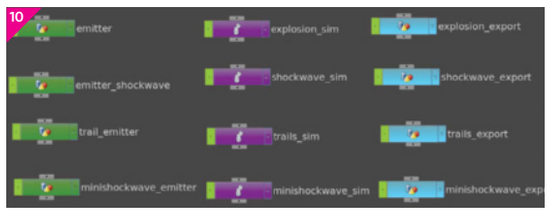
08 Trail emitters We continue working with the trail_emitter here, so after the Copy SOP add another Pop network for making particles from each sphere. Let's configure the Popnet by setting the Const. Birth Rate to 150,000, the Life Expectancy to 0.065 and Life Variance to 0.05. In the Attributes tab, the initial velocity is set to 'Set initial velocity' and the Variance set to 2.2, 2.2 and 2.2. Now exit from Popnet, add another cache node after the Pop network to save the simulation and, finally, connect it to create_density_volume.

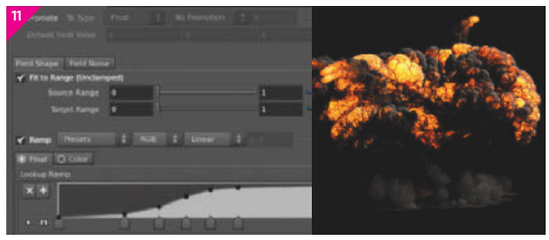
09 DOP networks and combustion Now duplicate the DOP network of the shockwave_sim and name it 'trail_sim'. We will configure the DOP network by going to the Pyro Solver in the Simulation tab and setting the Timescale to 1, Temperature Diffusion to 0.75, Cooling Rate to 0.7, Buoyancy Lift to 1, Buoyancy Dir as 0,1 and 0. Then in the Combustion tab, we activate Enable Combustion and set Ignition Temperature as 0.1, Burn Rate as 0.12, Fuel Inefficiency as 0.1, Temperature Output as 0.25 and Gas Released as 15. Now in Shape tab, set Dissipation as 0.025, Disturbance as 1, Shredding as 0.25 and Turbulence as 0.75. In the Gas Vortex Confinement node, set Confinement Scale as 2.5. The Division Size of Smoke Object 'Pyro' can be copied to the create_density_volume of trail_emitter, with the value left as 0.06, but if you want more resolution then you can change the value to 0.04. Remember to correct the size of the Pyro as you did with the trails. Now, at last, we duplicate the shockwave_export, change the paths of DOP and bgeo path and then you can simulate it.

10 Simulate shockwave trails This step is practically the same as what we did for the shockwaves but small, the idea is to simulate one and when we render it, we copy in each trail with some random rotation so we don't see the same movement. The most important thing here is using the TimeShift of each minishockwave to follow the trails touching the ground. So what we do is duplicate the shockwave_emitter, name it 'minishockwave_emitter', change the size of the noised object smaller, then duplicate the shockwave_sim and configure everything like the pyro size by setting the Division Size a 0.05, Otherwise we leave it, duplicate the shockwave_export and name it 'minishockwave_export'. Change every path of DOP and bgeo now, same as we did before with the others, and simulate it.









Collect references

To create a decent explosion, it's always good to start by watching references before you create anything, because with references you can find a lot of solutions that make it easy for you to do the explosion your way. For example, we can see real explosion colours that help us when we are shading. For the trails, we used the film *2012* as a reference for falling meteors as they are pretty good. You'll be able to find most references through Google.

11 Shading and colour For shading we can start with the explosion. You can use the pyro shader 'fireball', which was created when you added Explosion pyro from the 'shop'. Let's tweak the fireball a little bit, starting with the Smoke tab in the Density tab where we set the Final Amplitude as 7 for more density. You can tweak the colour ramp in the Color tab as much as you want – we have set the ramp as a mid to light grey colour. Now let's tweak the Color tab a bit, so set Final Amplitude as 15. We have a Wave ramp in Float ramp, but in case you don't understand, you can download the HIPNC file from FileSilo where everything is ready. The Color tab of the fire is a bit default except there's just a bit more red than yellow. We also activate Color Correct and set Hue Rotation as 0.015 and Saturation as 0.65. In the Field Shape of Fire's Color tab, set the Source range to a value between 0-8, add a Ramp Preset valley, set Final Amplitude to 0.75 and finally in the Shading tab set the Shadow Density to 2.5. Now you can use it as an explosion material, you can also use it for shockwave and minishockwave because it's the same density smoke. Trails works similarly and you can just duplicate from 'fireball'. In Fire we use Fire Density as temperature instead of heat and set Final Amplitude to 4, tweak Color Correct a bit and in the Shading tab add Shadow Density set to 5 for more shadow in the smoke. Then add the shader to the trails – we added Sky Light first while tweaking the shader. Also, deactivate the COP and Render Viewports from Color Correction in Color Settings. As well as this, remember to add a new mantra PBR for rendering and leave it all as default for now.

12 Lighting Let's add some lights for more realism and add Distant Light in the front of the explosion by clicking Ctrl+Distant Light, setting the Light Intensity as 0.22 and Light Color as 0.9, 1 and 1. Add more light from the back with Distant Light by also using Ctrl and setting Light Intensity as 0.4 and Light Color as 0.825,1 and 1. The Light Sun from before has a Light Intensity set to 0.6. Add a Volume Light for the explosion and trail; Light Intensity must be low here because we deactivated shadow for both. Set the Shadow Type as No Shadows to get a nice light scattering. You can use FumeFX for much faster rendering; just set the Light Intensity as 0.035 for the explosion, and set this to 0.2 for the trails. You can also name each light if you want. For improving render detail tweak the Sampling and add Allow Motion Blur. Remember, the composition is your friend for making your work better.

3DS MAX

Build modifiers with MCG

The Max Creation Graph is a really exciting new feature that Autodesk has been working on throughout 2014-2015. It was the number one most requested feature for 3ds Max and to be fair to the company, it listened to us! It shows that it is really is worth voting for features on the 3ds Max Feedback Feature Requests website.

The Max Creation Graph Editor, or MCG as it is shortened to, has completely revolutionised the way that users can create new tools, no longer needing to rely on complicated MAXScripts. Essentially, Autodesk has put in our hands the necessary tools to enable us to create modifiers, geometry and utility plugins.

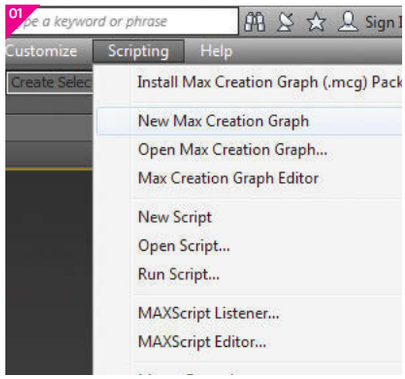
The MCG is a visual node-based interface that requires absolutely no programming knowledge whatsoever. Are the MAXScript days gone? Probably not entirely, but this tool certainly does away with it in quite a few situations.

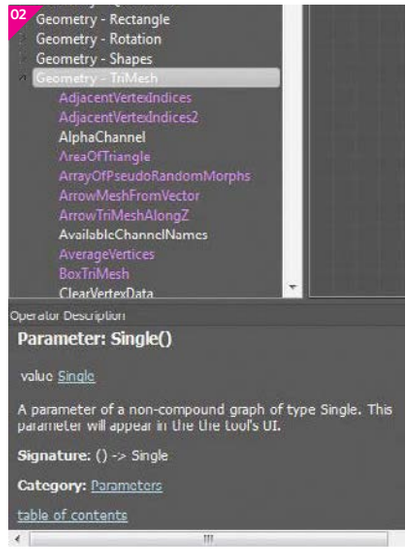
So how does it work? Well, because it's a node-based system, it's very similar in functionality to Particle Flow or the 3ds Max Material Editor. Getting used to wiring things together will be key to mastering the MCG. So what is being wired together? Essentially it's a case of wiring functions and commands together to create a final output node which results in a useable asset for your scene. If that sounds like serious jargon then don't worry, we'll explore this over the next few steps.

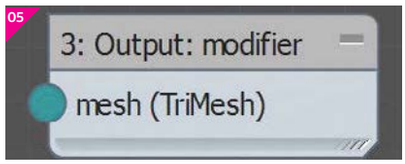
The final thing we want to draw your attention to, before we dive in, is the ability to package and share the tools you create. This is ideal for studios of any size as well as developers who wish to share/sell tools to a wider audience.

With that being said, let's explore what we can do with it and hopefully you'll be blown away by the possibilities. We'll create a new welding modifier with a few simple steps and hopefully it'll open your eyes to the possibilities.

01 Interface basics There are several ways to get the MCG open. The main one will be through the Scripting menu at the top. You'll notice that you can choose to install an MCG package, create a new graph or just open the MCG in the same state that it was closed. Creating a new graph will give you a fresh new space for creating a new tool. The graphs appear as tabs at the top of the workspace and you can open as many of these as you like.





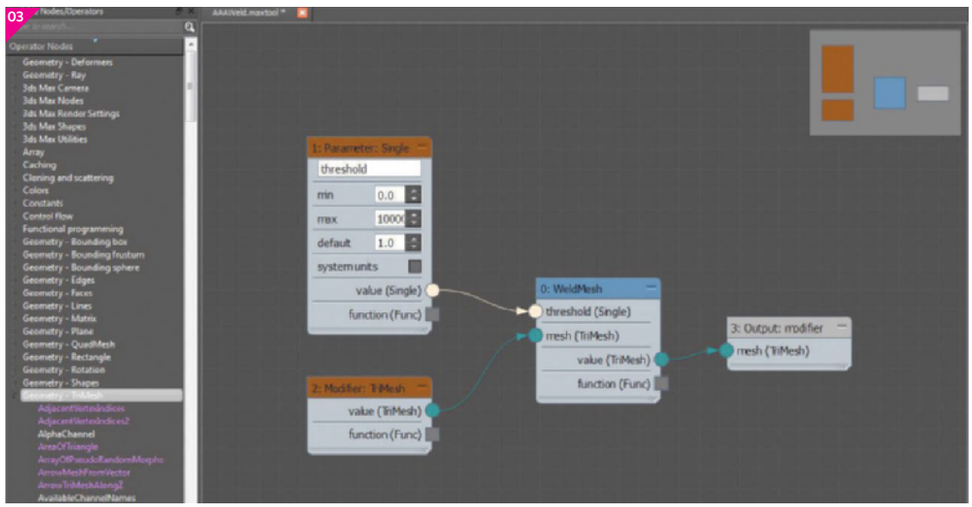


02 Interface essentials

The interface is split up into four main sections. The first is the list of Operator nodes which can be dragged into the second section (the graph). To make a tool, you need to insert multiple nodes and wire them together. The third section is the Operator Description and this tells you more about the node that is selected. This is really helpful, especially when you're learning. The fourth and final section is the Message Log, which gives you helpful information when building your tools.

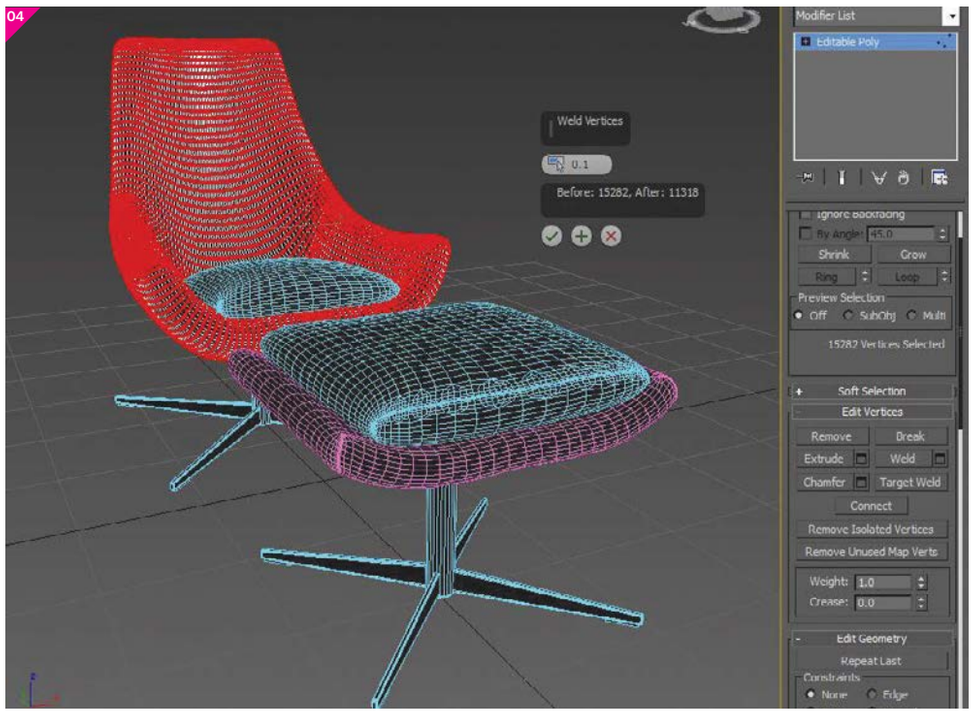
03 Interface advanced

Many of the shortcuts are the same as the node-based Material Editor so if you're used to that then you should be fine. You can use Ctrl+Alt+select on a node and that will move the parent and its children. You can also Shift+drag a node to duplicate it. A really helpful shortcut is to use Ctrl+select+drag on a node to drag it onto a wire and it'll insert the node in-between the two wired nodes. There are lots of other shortcuts, but these are likely to be the main ones that'll really speed up your workflow.



04 A weld modifier

As we're sure you're aware, when in Edit Poly mode you can weld vertices based on a threshold. Up until now, this has always been baked in from that point forward. If you wanted to undo your weld or change its properties then you were helpless! The day has come now where we can fairly easily create our own modifier and apply it to a mesh. We can then change the properties to our heart's content while the viewport shows us the resulting mesh. This could come in handy if you wanted to animate the threshold value and see your geometry transform over time in front of you.



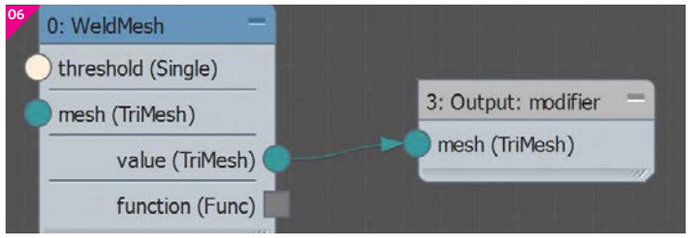
05 Create the modifier output

Open the MCG and create an output node. This will determine how we interact with the tool in the 3ds Max interface. You can find all the options by hitting X and typing 'Output'. You'll see that you only have five options including a Modifier option. Choose this one and watch the node appear. By choosing this, we will be able to apply our tool to a mesh by selecting it from the modifier list. Now familiarise yourself with your first ever node!

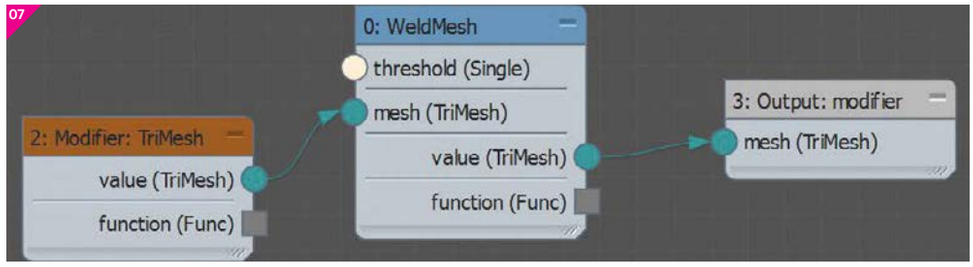
The search tool

Everyone is used to being able to search for anything, and so good software designers make it as natural as possible for users to search for tools and actions while they're working. Well 3ds Max has done a great job of this. Not only has it given you the search box in the top LHS, but you can also press X at any time to give you a list of actions on the go. As you type, the list becomes more defined and then you simply click on your chosen option for it to be added to the graph.

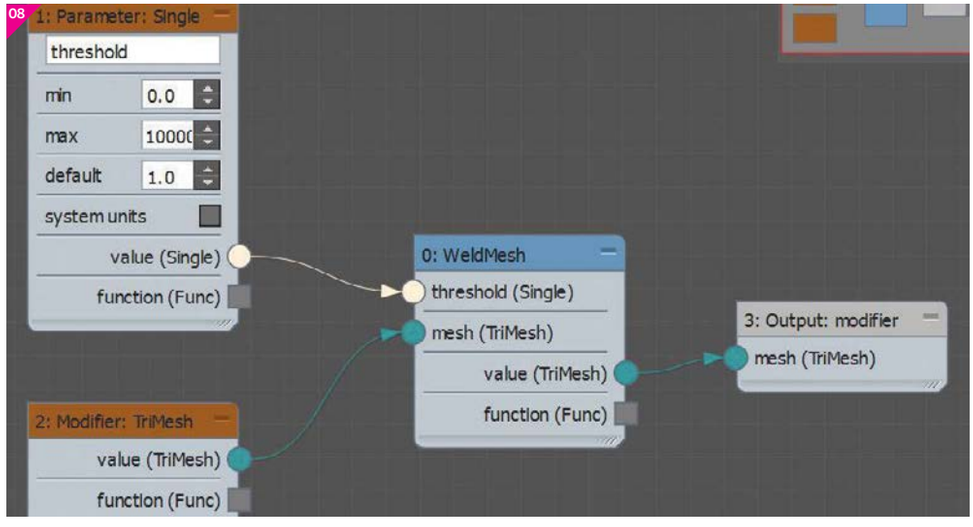
06 Create the weld operator Use the search feature again to find WeldMesh and add it to your graph. This operator has a TriMesh input and a TriMesh output. This means that it's going to take in a TriMesh, do something to it and then return a new TriMesh. Let's begin by connecting our operator and our output modifier. Do this by dragging between the value output and the mesh input. For your reference, if you want to disconnect the two nodes at any point you can do this by either selecting the connection and hitting Delete or selecting it, right-clicking and choosing 'Disconnect Edge'.



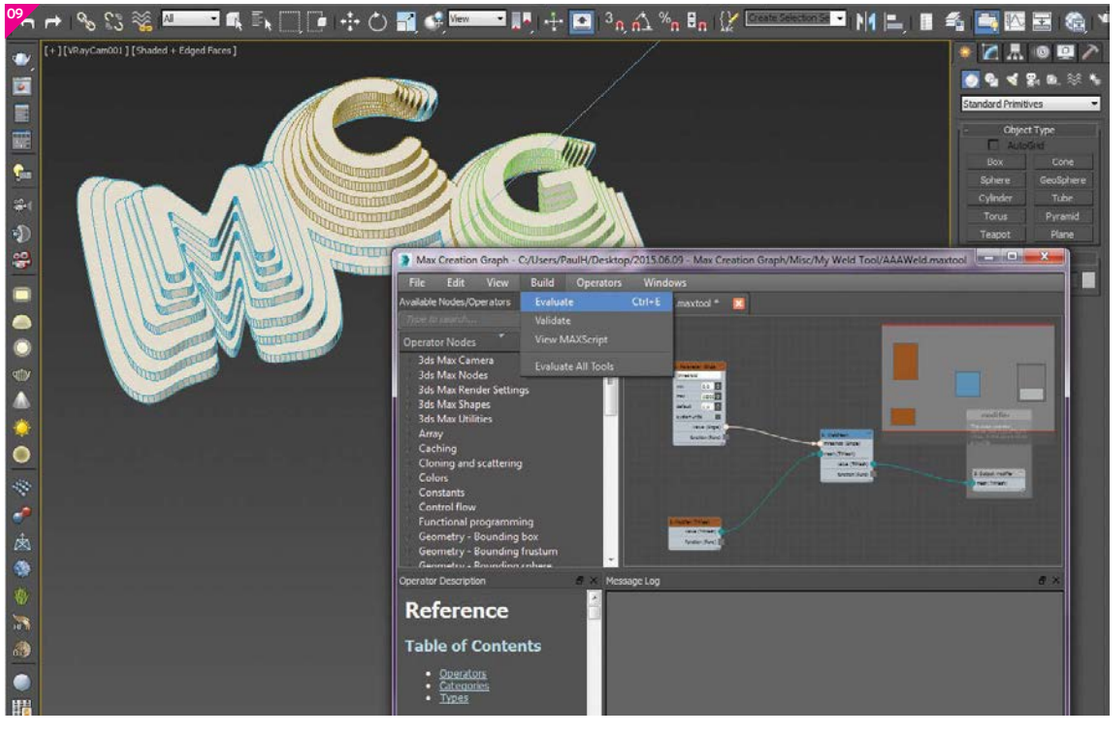
07 Input the selected mesh If you think of how this modifier will be used, you'll know that it'll be applied to an object. In the MCG we need to pass this selected object into the WeldMesh operator. Using the search tool again type 'Modifier' and select the TriMesh option. This node represents the object that your modifier is applied to. Connect this up to the operator by connecting the value output and the mesh input. We now just have to set up the WeldMesh threshold parameters, which we'll do in the next step.



08 Set up threshold parameters You'll notice that the WeldMesh operator has a 'threshold (Single)' input. This will control how close the vertices need to be before they start welding. Search 'Parameter' and select the 'single' option because that's what the WeldMesh is asking for. Rename the parameter and define your min, max and default values. These will appear in your modifier as editable parameters. Complete your tool by connecting the 'value (Single)' output to the 'threshold (Single)' input. You can ignore the remaining function output on the WeldMesh operator.

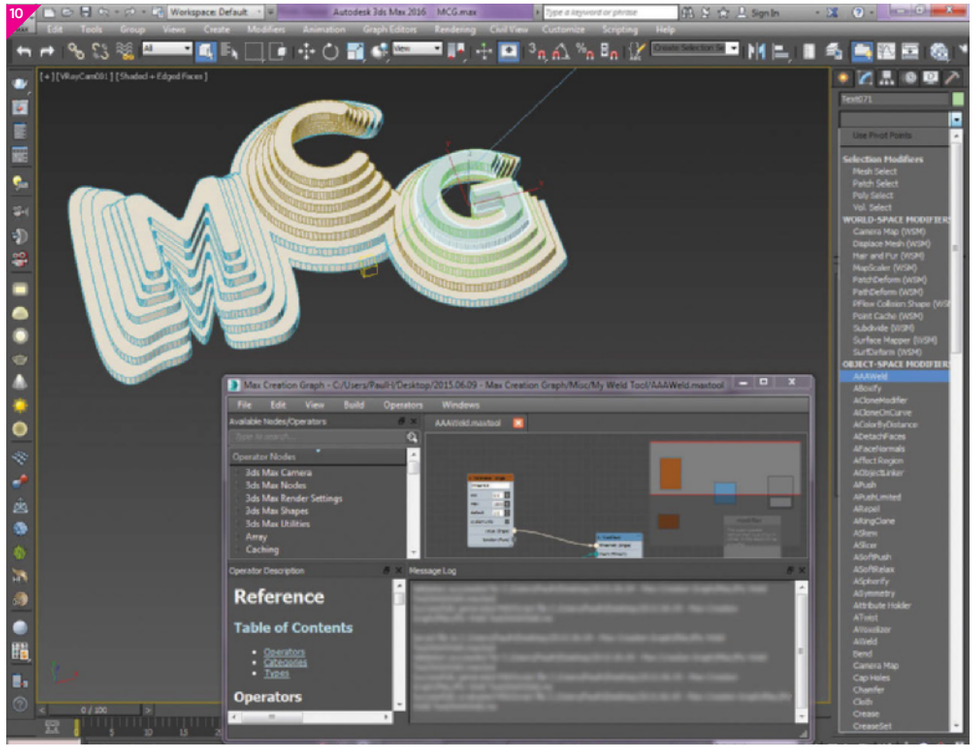


09 Save and build Make sure you save your tool now that it's complete. The recommended place is in '%userprofile%/Autodesk/3ds Max 2016/Max Creation Graph'. Remember the name you use because it will appear in the modifier list as this name. To make it appear in your modifier list you need to build and evaluate it. If you've ever done any software development then you'll understand why this might be required. Do this by going to the Build menu at the top and selecting Evaluate. Alternatively you can use Ctrl+E, which will do the same thing. Close the MCG because you're now ready to test your first ever tool created using the MCG.

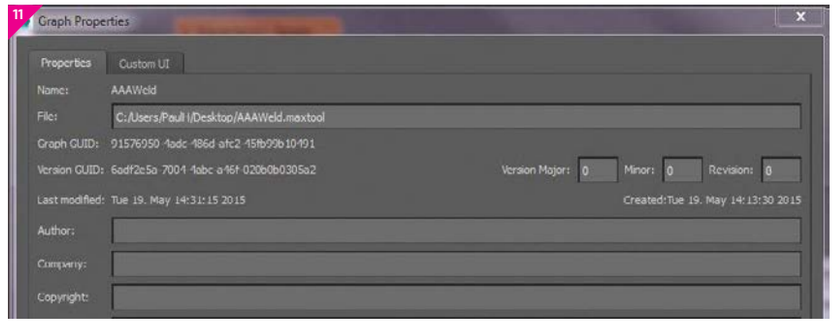


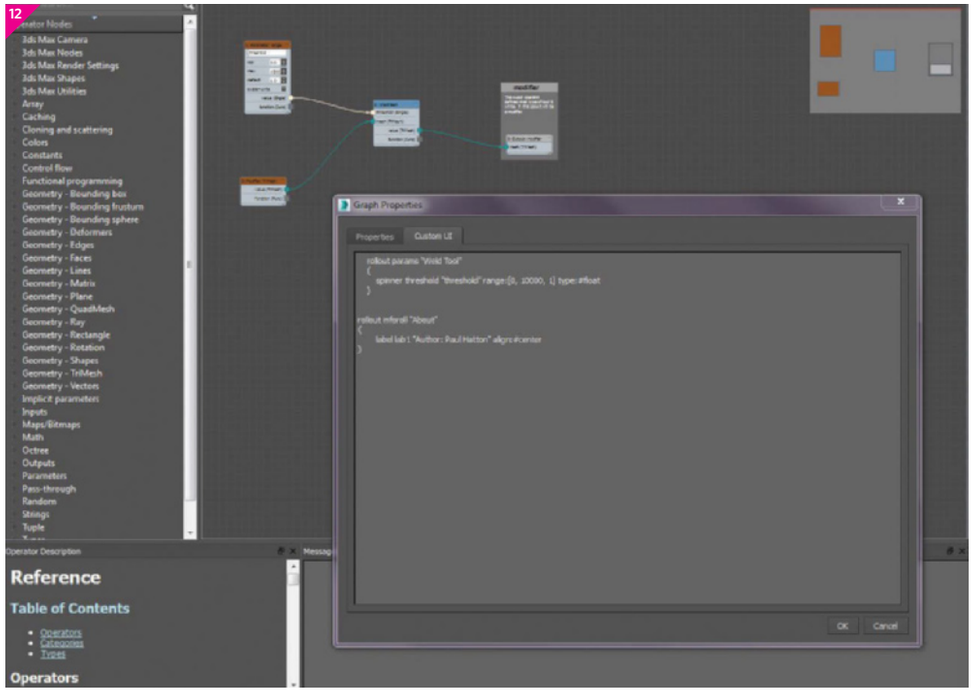
10 Use your modifier First you need to create an object that contains a load of faces that are independent of each other, in other words the vertices are not yet welded. One of the simplest ways to do this is to create a box and detach each face. Then attach them back together into one editable poly. There are scripts out there to do this for you but this way will only take 30 seconds. Select your object and go to the modifier list. Hunt down your modifier and add it to the stack. If you play around with the threshold parameter you'll see your box adjust accordingly.

11 Set your tool properties The tool properties are especially important if you are planning on distributing your tools to other people. Go to 'Edit Graph Properties' again and there you'll see a load of properties like Author and Company. Fill all of these in and then click OK. With that done don't forget that you'll have to save the file and re-evaluate it for the modifier to include the changes in the main interface. If you make a change like this then unfortunately the modifier will need reapplying to your object.



12 Customise the modifier interface Imagine we want to change the rollout name from 'Parameters' to something a little bit more descriptive. Unfortunately this isn't that straightforward to achieve in the node-based editor that Autodesk has given us. Saying that though, it has given us a workaround. Firstly, go to 'Build and View MAXScript' – this is your tool in MAXScript form. Scroll down and copy to the clipboard the section 'rollout params "Parameters"'. Now go to Edit and 'Edit Graph Properties' and the custom UI tab. Paste the code and adjust the word 'Parameters' for something like 'Paul's Weld Tool' or whatever your name is!





> The tool properties are especially important if you are planning on distributing your tools

Input iNode and checkNodeValidity

An Input iNode is used when you want to allow the user to select a piece of geometry from within a modifier. This might, for example, be to select a piece of geometry that you want substituted in for another piece of geometry. Giving the user the flexibility to choose at run time is vital. If you develop a tool with this requirement then always make sure you use a checkNodeValidity node in its output. This is a sensible form of error checking to make sure everything runs smoothly and according to plan.

ZBRUSH

Style FiberMesh hair

This tutorial will break down one approach for exploring an idea from conception to final 3D render. Some parts of this workflow may be absorbed into your own process and enable you to take a more fluid approach to taking a reference and enabling it to influence your ideas past the conception stage.

There will also be a slightly more detailed explanation of how to use ZBrush's FiberMesh for creating non-photoreal hair. The explanation for attributes and values used for this project will give you the knowledge to generate unique hairstyles very quickly.

01

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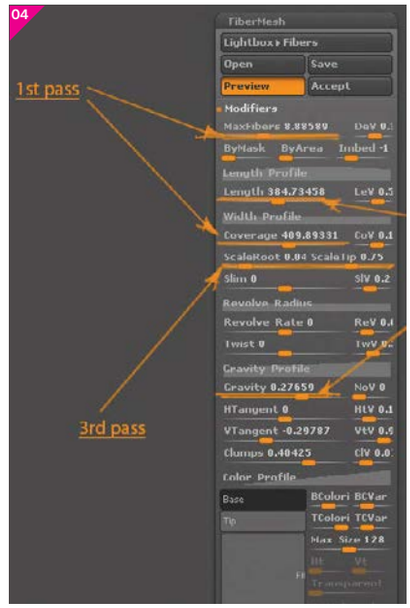
from **filesilo.co.uk/3dartist**
- FiberMesh settings
- Tutorial images

01 The idea Projects start as very simple ideas, they can come from anything, but it's important to recognise what is important when you discover the seed. As an example this project began with a visit to Japan, and that country and its culture touched us. We were inspired by how they mix together their ancient culture, temples and colours, with the new age, anime, manga and technology. We felt instantly compelled to create a piece in which we could make use of that fusion.

02 Concept art The first step to conception is gathering good reference, so pull these from the internet, books and previous sketches. Finding key pieces that fit the theme is important but do not allow yourself to fall into the hole of never moving on from this stage. At the end of this process we had a concept showing what we had in mind from the beginning – the traditional culture and new age fusion was in the drawing and it had a unique presence. We ended up adding a mixture of helmet and tiara with a more sci-fi style. Even though it's a bit futuristic the idea was to maintain a classic look.

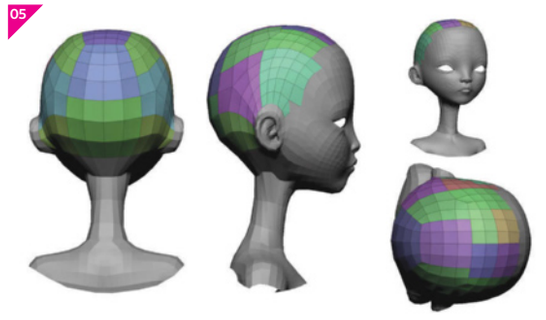
03 The 3D process Once the proportions are matched, add the details and extra parts from the new design. This should be the 3D equivalent of the sketch before the paint-over – you will start to get a very good understanding of what works and what does not. At this point you can start to make more permanent changes; adding asymmetry where the eye is drawn is a fantastic way to breathe life into a character, but be mindful not to overcomplicate this – allow it to be subtle. Any area with hard-surface objects should be rebuilt cleanly in whatever package you prefer, then brought to ZBrush for details like scratches and screws. The final step of adding details is done with the posed character, for more information on this part please visit danielorive.com.

04 FiberMesh setup A vital component to building your own haircut is understanding how FiberMesh parameters work. The goal with this hairstyle is to show each strand and enable it to be chunky unlike normal hair, so to achieve this the most important values to change are Coverage and Max Fibers. The goal should be to balance the thickness of the hair with the quantity needed to cover the head. After the balance has been achieved, using Gravity and Length will help to give a better shape to the hair. Finally, using Scale Root and Scale Tip will finish the hair by controlling the profile of each strand. Included with the project files on FileSilo are the parameters used in this project to help you.

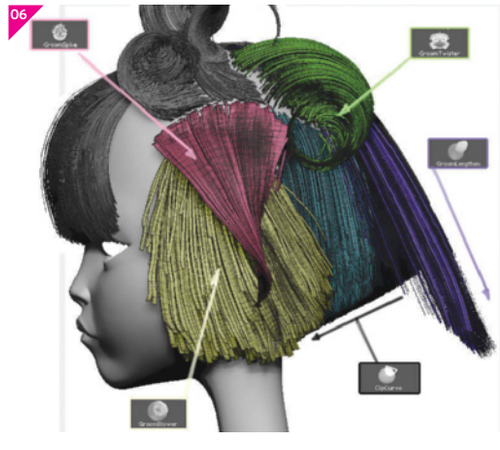


Patience is the key

At the beginning, projects like this can be daunting, but be patient and make sure to practise with the tools we use before starting the haircut. You should also try to understand how the brushes work to get the best end result.



05 Order Polygroups Once you have an understanding of the basic parameters needed to make the desired hairstyle, it is time to begin the process of placing styling and cutting the FiberMesh. The first step is to work out how many parts the haircut will be comprised, in this project the fringe and body of hair are separate objects to allow an orderly approach to styling. The initial step in using FiberMesh is to extract the polygons where the hair will be growing from, in this case the top of the head is duplicated into a new SubTool. This new SubTool is then divided into different Polygroups which will allow each section to become a lock of hair. This project required 11 Polygroups for the hair and eight for the fringe. Typically between 12 and 20 locks make a convincing haircut, working with more can get cumbersome to manage and fewer can leave the volume lacking. After the Polygroups are made and the hair simulated using the previously defined parameters for this character, we need only click Accept and ZBrush will generate a new SubTool with the hair.



06 Haircut Roll up each lock of hair using the GroomerTwist tool (click from the root and drag to the tip to create buns), this will let you make better assessments about how the overall haircut is looking and keep the hair well organised as you work between locks. Next, begin to work properly with each lock, mess up the buns by using Groom Spike and give more volume using Groom Blower. Using the buns method will naturally give the hair more fullness and help it to lose some of the stiff CG tendencies. You can refine further with Groom Hair Short to shape, Move' and ClipCurve are both excellent tools for reducing length precisely. If the fibres are not long enough 'Groom Fast Lengthen' helps add length back to the lock. If you would like to see a video showing the creation of the hair in the Etsuko project, visit youtube.com/watch?v=mobIAJS7yPU.

MAYA

Texture a realistic pocket watch

It's often the little details that really make an image shine and become something truly unique. It could be small imperfections that give that last little touch or that shimmer of light that portrays the right mood. There are many things that you need to consider when you are creating a realistic image, but it's often those finishing touches that are hard to get right and really master. In this tutorial we'll point out some tips and tricks that can help you achieve a better critical view in your artwork.

We'll address how small details or a shader can direct the eye of your audience. We take you through why it's all about finding the right balance in your image. Furthermore we will give an insight about how and when to add elements or sometimes remove things to get a better end result. In that process we will take you through how we work with procedural textures to help tweak that balance in a more efficient and controllable way. And, finally, we will take the lessons learned into the world of compositing to see how they translate and help you with the final render.

Try to apply this to your own work and see the difference it will make – you can make a big change with extra details.

01 Details that actually matter Not only will the shading and lighting give you a realistic feeling, but so will the amount of objects and details in the scene. One of the goals for this render was to make it interesting enough so that's why small details were added. For example, look at the chain and also the wheelwork inside the watch. It's different for every scene, but if you don't add enough details you soon get the feeling that it's not complete and with that you lose the ability to create a believable image. Balance your image well to ensure you keep your audience's interest.

02 Gold shader This pocket watch needed a beautiful gold shader, but taking it to a higher level required some extras which could be achieved by adding different kinds of Bump maps and other textures. One way of losing believability is when you use repeating textures which you do not often see in the real world. A lot of the time you can get a nice Bump map by using things like a fractal or noise. Tweak the settings and you can get some interesting results. Of course you can also use images from outside the program or do a combination of the two.

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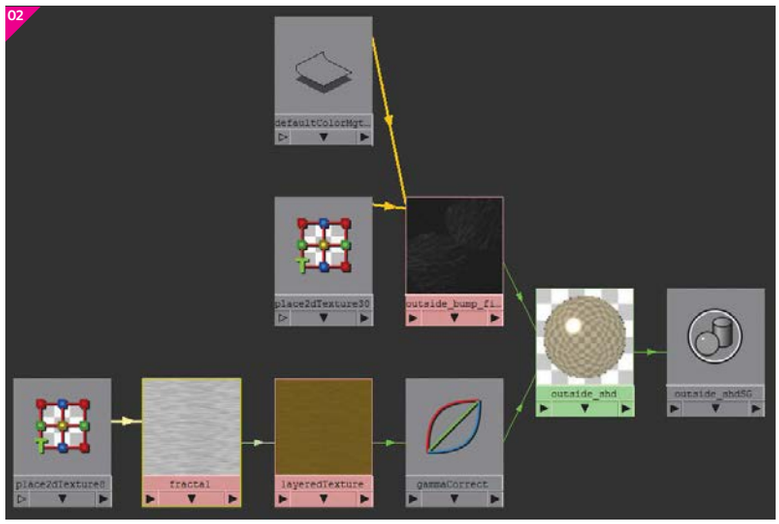
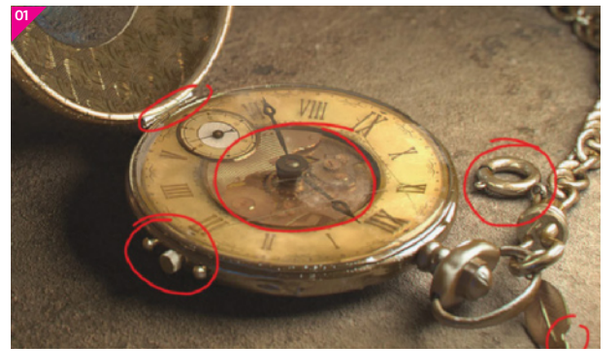
- Scene file
- Tutorial images

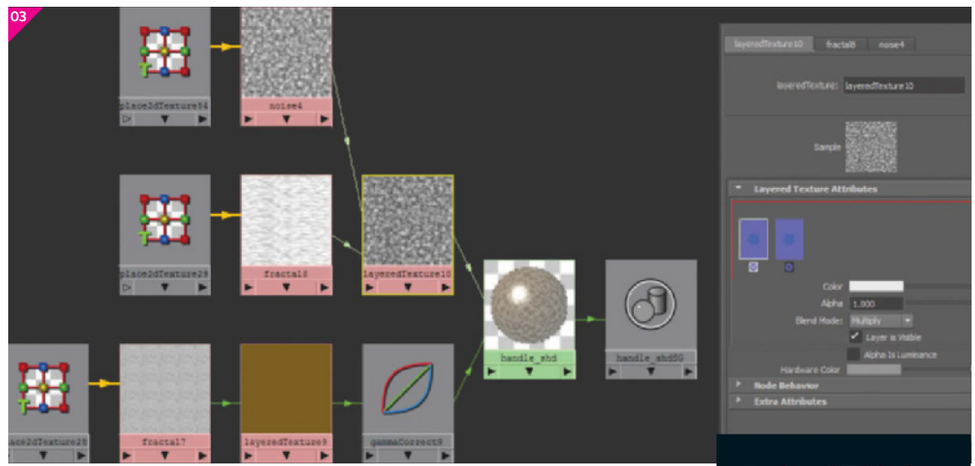




> You can't always get the result you want when you're only using procedural textures, but using them as much as possible can let you stay flexible

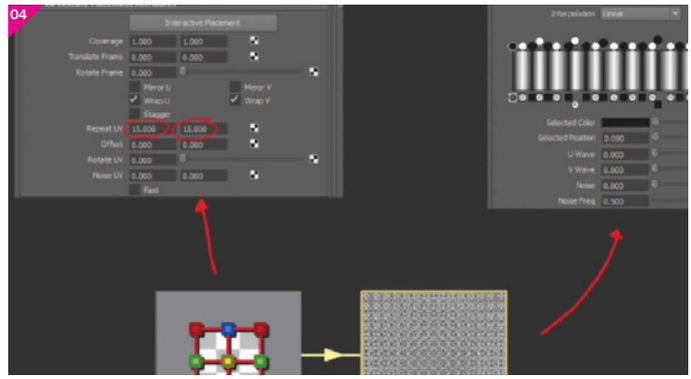
03 Tweak with procedural textures

It's great working with procedural textures because of their flexibility. They are solely based on a set of nodes in the 3D application. You can't always get the result you want when you're only using procedural textures, but using them as much as possible can let you stay flexible and perform quick tweaks. Another thing you can do is combine 2D textures, like fractals and noise, and use them in a layered texture. In this way you can multiply, add or subtract layers. This can give you the possibility to create some fantastic procedural textures by only using everything that the 3D application offers you.



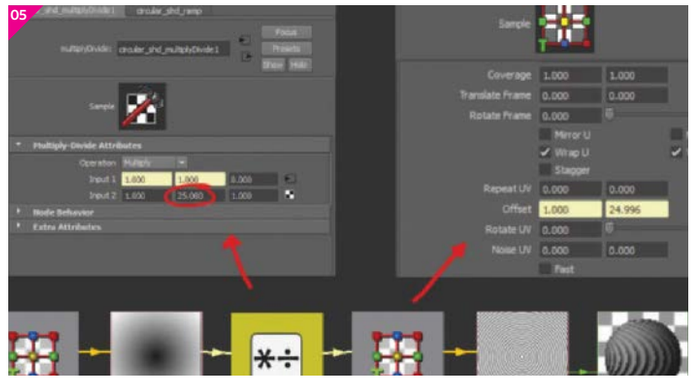
04 Easy adjustable circular shader

To divide the details in the image nicely we'll add some details to the top cover of the pocket watch. We'll make a circular pattern to use it as a bump of the shader. A simple way to do this is using a circular ramp with a black-and-white striped pattern and create the repetitions manually. The downside to this is that it will become time-consuming if you want to change the amount of repetitions, especially when working with higher numbers. It's better to build a procedural network that allows for changing the circular repetitions easily.



05 Create the repeatable circular shader

The reason to use procedural shaders is for flexibility. Let's make it easy to change the amount of circular repetitions by using a trick to remap the UVs in our procedural network with a place2DTexture node. First we disable its default offsets by setting repeatU and repeatV to 0. Then we define our own offsets as inputs to offsetU and offsetV. For this, we use a simple black-and-white circular ramp. Add in a multiplyDivide node to easily control the amount of repetitions, as this way you will have more flexibility and save time.



Rule of Thirds

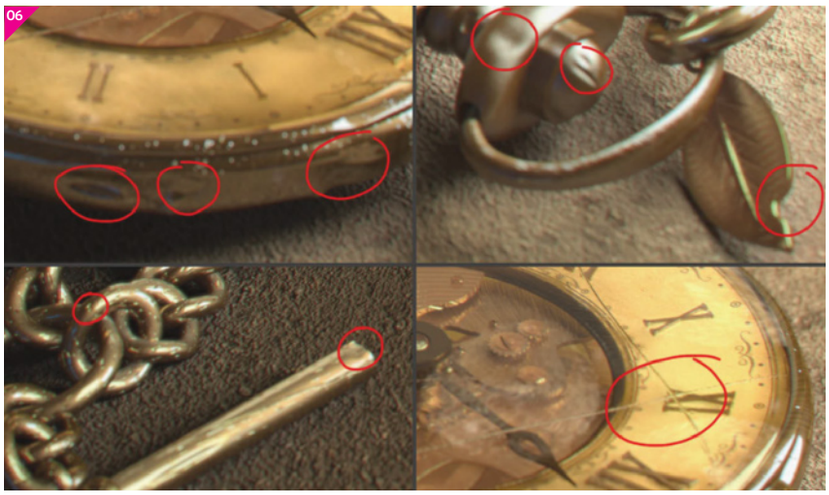
The guideline of Rule of Thirds is great for balancing the composition of your image. The guideline suggests to divide your image into nine equal parts, with two horizontal and two vertical lines, and that important elements should be placed on the intersections of those lines. It's believed that aligning objects to these points balances your image and will enable a viewer to interact with it more naturally. It's more of a rule of thumb, so don't force yourself into unnatural compositions trying to use this rule, but use it when it feels right.

06 Tricks to make it realistic One of the most important things in making a realistic image is to create imperfections. Add different kinds of little dents and bumps but don't overdo it. We only need to feel a sense of it, but it should not take all our attention. Most objects in the real world are not perfect so when you create an object try to make little adjustments to everything. Let's say you want to create a wooden beam. Don't just make a rectangle and give it a texture – give it all sorts of imperfections. Add enough edges and move some vertices.

07 Render passes For control during compositing you definitely need render passes. By rendering your image with its separate passes like diffuse, lighting, GI and reflection you can re-create your exact beauty layer. With these rendered separately you can still control how these layers are combined during compositing. For example, tweak the amount of shadow on the ground or the diffuse colour of a single object (using a multimatte) and apply the correct lighting on top of that. Get as much information out of your 3D application as you require to have all the control you need.

08 Chromatic Aberration In real life, when you take a picture, the lens of your camera can produce distortion when there is a failure to focus all colours to the same point on the camera's sensor. As colours have their individual wavelengths, they refract differently through the lens. By using a zoom blur on the red channel you can offset this colour with the longer wavelength towards the edges of the screen and fake the lens refraction. You don't want to exaggerate it *too* much, but if it's done right it can really boost the believability of your image.

09 Dust and particles What's also interesting is the use of dust and particles. Normally, objects are never totally clean and will always have some dust on them, and this also applies to the lens of your camera. By adding dirt you will make your image more realistic because it's not perfect anymore. This also applies to particles floating in the air. In real life, when there is a sunbeam, you will see quite clearly that there are little particles all over the place. In this case there are no sunbeams but there is light so there will always be some dusty particles floating around.



Weighing your image

Another way to balance your image is looking at the visual weight of its elements. When an object is positioned to the right of your image in an empty space the weight shifts to the right. To balance it out you'll have to add weight to the other side. In this case you have the detailed inside of the pocket watch on the right and the top cover on the left. To add enough weight to the top cover, try adding a detailed pattern. Similar weight balancing is going on with the chain in the bottom left and top right.

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Technique focus

Incredible 3D artists take us behind their artwork

SHADING For the skin I used VrayFastSSS2, as it's the best way to add a viscous aspect to my model. I always put my Diffuse map on the SSS colour channel instead of the Diffuse colour channel for a better result. I then play with the scatter radius parameter to get what I want. I don't need to use a Displacement map for this kind of skin, a Bump map does the job.

Pierrick Grillet
pierrick.artstation.com

Pierrick is a CG artist working in Paris as a 3D generalist, mostly for historical docudramas

Software
3ds Max, V-Ray, ZBrush

Sick sad world!, 2015

BOXX APEXX 2 2401

BOXX Technologies squeezes full workstation rendering performance into a micro chassis

Although BOXX is a familiar workstation name in the US, its consumer arm is only just starting out in the UK, with a manufacturing centre in Wales. As of writing, the UK website is still under construction and even the product line-up hasn't been finalised yet. But the company has been quick off the mark in getting a system to us, with the APEXX 2 2401 arriving in our labs this month.

Its most noticeable feature is its diminutive size. Most desktop workstations we review come in gigantic towers for the maximum possible internal space, but these carry a few downsides – they're heavy and take up a lot of space. The minitower case chosen by BOXX is no bigger than a standard office workstation, and it can be squeezed under a monitor if you wish.

That's more impressive considering it has a specification that's perfectly suited to 3D work. It's a familiar list of components – an Nvidia Quadro K2200 and Intel's Core i7-4790k processor, overclocked to 4.5GHz from its standard 4.4GHz Turbo Mode frequency. Then there's 16GB of memory and a 240GB Intel 730 series SSD, with Windows 7 64-bit loaded onto it. The MicroATX motherboard is an Asus GRYPHON Z97.

We've seen a similar configuration used in many other desktop workstations over the last year, and it's a good spec for a mid-range rendering system.

BOXX told us that an online system configuration tool is coming to its website soon, but confirmed alternative choices of graphics card are available, including a Quadro K4200 if you are after more graphics power in your BOXX machine.

It's also worth pointing out that Windows 10 is an optional upgrade as well. Even if you don't order it from BOXX, as with any PC sold in the next 12 months, Microsoft will prompt you to install the new operating system, although after the first year it ceases to be a free upgrade.

The APEXX 2 fared well in all our tests, exactly matching other (far larger) desktop systems with the same specification. The CINEBENCH result of 901 is identical to Workstation Specialists' WSX-140, which had the same CPU running at the same speed and less than three seconds difference in the 3ds Max render times.

In the same way, we saw results in our graphics tests that match other systems shipped with the same K2200 graphics card. Chillblast's Fusion Projection scored within five per cent in SPECviewperf, with differences of less than one per cent in some tests. Good results.

Unfortunately, though, the APEXX 2 seems expensive for what you get. For a start, Intel's brand-new 'Skylake' Core i7-6700k chip has replaced the 4790k as the most powerful quad-core Intel processor. It's also around ten per cent faster, and we've yet to review a desktop workstation that uses it so far, but this does mean though that the APEXX 2 is now based on last-generation technology.

Other more affordable workstations have managed to offer a better specification too. The aforementioned WSX-140 came with the same processor but a larger 32GB memory capacity, for example, yet cost £400 less.

RIGHT If you struggle with giant PC desktop cases, the APEXX 2's minitower chassis will be a welcome relief

ABOVE An all-in-one liquid cooling setup helps maintain a stable 4.5GHz overclock

BELOW Marketed as a compact, entry-level machine, the APEXX 2 has support for two full-length professional GPUs

ABOVE The Quadro K2200 has consistently proved itself to be a great midrange card

> "The APEXX 2 fared well in our tests, matching other (far larger) desktop systems with the same specification"

ABOVE The APEXX 2 is a well-built mini workstation that should be a great starting point for BOXX in the UK, although it's a bit pricey

Essential info

Price	£2,499 inc VAT
Website	boxxtech.com
CPU	Intel Core i7-4790K overclocked to 4.5GHz
RAM	16B DDR3 memory
SSD	240 Intel 730 Series
GPU	Nvidia Quadro K220
Motherboard	Asus GRYPHON Z97
Power supply	550W

Summary

Features ★★★★☆
Performance ★★★★☆
Design ★★★½☆
Value for money ★★★☆☆

Verdict ★★★½☆

The APEXX 2 is a well-built miniworkstation that should be a great starting point for BOXX in the UK, although it's a bit pricey

The APEXX 2 has no internal hard disk and the SSD is only 240GB. Admittedly there is a liquid-cooling system installed, but even this doesn't explain the higher price.

Even so, this is a good mid-range system, and is a lot more compact than many other workstations we've tested. BOXX offers a three-year warranty period, and it's fairly tidy on the inside, although there are limits to what can be done with cables in a MicroATX chassis.

At this price though, it would be reasonable to expect something better – like including a Quadro K4200 or indeed more storage. The high price seems to be the Achilles' heel of the APEXX 2, then, but really, that is our only issue with it.

Orestis Bastounis

ABOVE Sci-fi City image contributors – Tim Holleyman, Shahin Toosi, Tilman Paulin, Scott Pritchard, George Zwier, Stephen Bennett

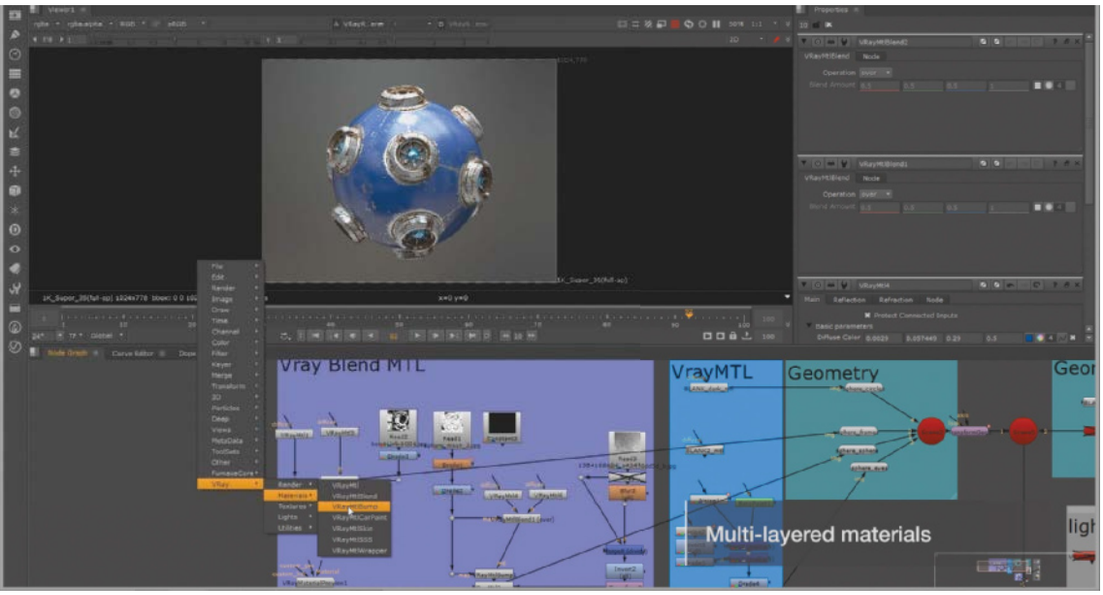
V-Ray for NUKE

Chaos Group and The Foundry create blurred lines between 3D and compositing with their latest plugin

You may start to hear 'let's do it in postproduction', a bit more often and 'let's *fix* it in post' a little less around the studio. And that's because the new plugin from Chaos Group is another step towards closing the gap between 3D and compositing, enabling compositors to access V-Ray 3.0's production-quality ray-traced lighting, shading and rendering capabilities, directly inside NUKE. Artists can now tweak their workflow and undertake tasks more traditionally achieved at the 3D stage, while at the same time working in NUKE on a composite.

The nodes available in V-Ray for NUKE are divided into three categories: Render, Materials and Lights, and all three are well integrated into the NUKE UI making it feel like a natural extension of the application. Existing V-Ray users will start feeling at home almost immediately as many of the nodes available operate in either a similar fashion or identically to their 3D application counterparts. For example, the VRayRenderer node has a simplified version of the same settings available in Maya and 3ds Max, and the same inputs as NUKE's ScanlineRender. The VRayBackground node is for setting up environment overrides, and should also be familiar to V-Ray users. For materials it's much the same; VRayMtlBlend, VRayMtlBump, VRayMtlCarPaint, VRayMtlSkin, VRayMtlSSS, VRayMtlWrapper and VRayMtl are all included and what you'd expect to see features-wise in a 3D app. It would be good, though, to see VRayToon join the list and perhaps something for hair and fur too. But it's still a comprehensive offering of physically based and multilayered materials for an initial release. For lighting, most NUKE lights are supported and there are VRayLightAmbient, VRayLightDome, VRayLightIES, VRayLightMesh, VRayLightRect and VRayLightSphere nodes which, as before, is a comprehensive offering, but it would be interesting to see VRaySun and VRaySky also on the roster.

With no big surprises in the impressive features available, it becomes clear when testing the plugin that the surprise and main advantage for using it is the flexible working approach to shot setup and rendering and how that becomes a time-saving alternative. Take the VRayPtex texture node for example. It does basically the same as the 3D

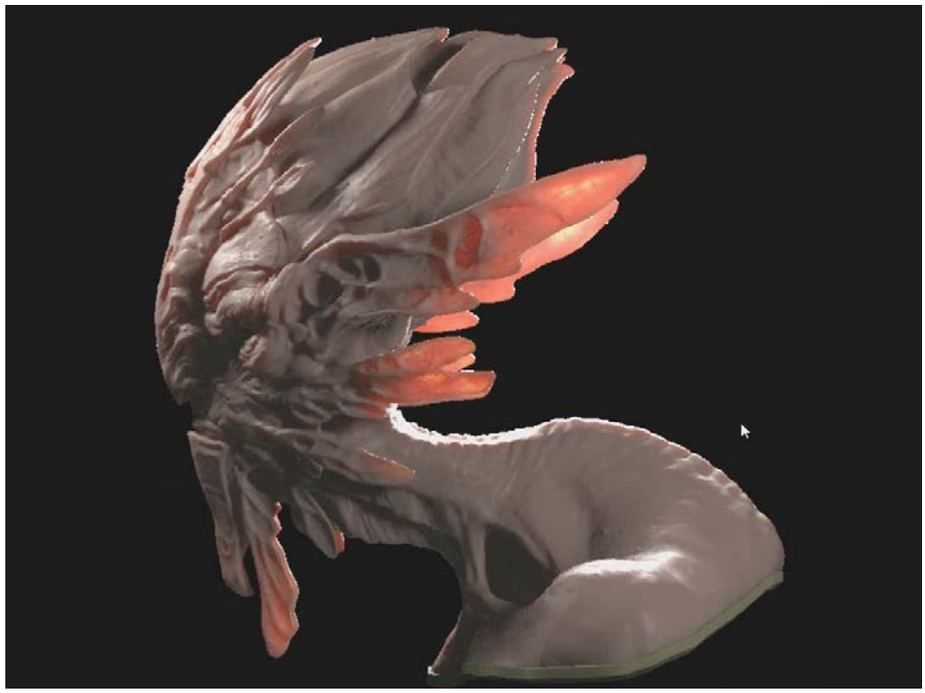


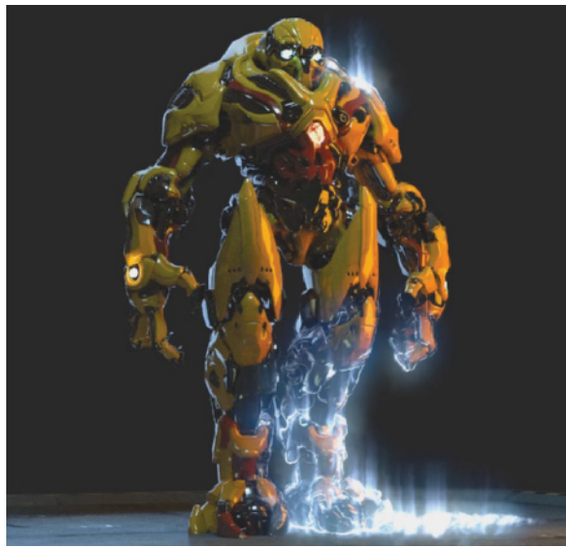
> Being able to rework subsurface scattering using V-Ray lights and VRayMtlSSS in NUKE is a very useful labour-saving alternative to sending shots back to the 3D department

TOP LEFT The VRayMtlBlend node lets you layer V-Ray compatible materials by taking a base materials and applying other materials on top

BOTTOM LEFT Translucent materials, such as skin, are only a few clicks away with the VRayMtlSSS node and a range of example presets

BELOW V-Ray in NUKE opens up a lot of new areas of possibility for artists to explore and exciting changes to existing workflow practices





application version, but once you have finished texture painting you won't need to switch back from say MARI, Mudbox or 3D-Coat. Instead, you can add a VRayPtex node to your NUKE network and gain a direct link between the painting package and NUKE via V-Ray, letting you jump straight to NUKE when painting is complete. Equally, being able to rework subsurface scattering using V-Ray lights and VRayMtlSSS in NUKE is a very useful labour-saving alternative to resending shots back to the 3D department for test rendering and refinement should a supervisor request changes. It's also fast enough that it's possible for you to sit with a supervisor while the changes are made.

Existing NUKE nodes are largely supported, although we didn't have an opportunity to test every one. For situations where camera projection work can be required such as environments, matte paintings and set extensions, the plugin is adaptable enough to support NUKE's Project3D node. This means that elements can be matched if misaligned inside NUKE itself. Once the network is set up, default NUKE nodes can be used to complete the compositing. There's also a VRayCamera node for overriding the FOV angle and several camera types.

The integration of V-Ray into NUKE has been well executed, giving compositors a powerful and production-proven ray-tracing renderer that's fast and efficient. It also unlocks new workflows that give more control to the compositing artist. This is a tool that has been thoughtfully designed to meet production requirements.

Paul Champion

Essential info

Price	£650 / $1040
Website	chaosgroup.com/en/2/v-ray-nuke.html
OS	64-bit Windows 8, 7 / 64-bit Linux 6 WS and up / 64-bit CentOS 6 and up
NUKE requirements	64-bit NUKE / NUKEX 9, 8, 7
Geometry	V-Ray scene files and proxy objects included
NUKE lights	Light, Direct, Point and Spot nodes

Summary

Features ★★★★½
Performance ★★★★½
Design ★★★★★
Value for money ★★★★½

Verdict ★★★★½

New and experienced compositors are certain to benefit from this timely update for NUKE

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Xxx

Trojan Horse Was a Unicorn 2015

Another resoundingly successfully Trojan Horse Was a Unicorn included the launch of THU TV, but the event's future is uncertain

Outdoing itself for a third consecutive year, Trojan Horse Was A Unicorn (THU) adeptly proved once more why it's voted the number one festival of its type in the world. Located on the beautiful sandy shores of remote Tróia in Portugal, the annual September get-together attracts leading artists and a purposefully small tribe of attendees from around the world to the five-day festival and bootcamp. On the schedule are talks, live demos, mentorship sessions, recruitment events, parties, fire-side chats, workshops, live drawing sessions, tribe-building events and late night art battles starting at midnight in the casino adjacent to the venue. There's not much time for sleep, but sleeping is quite rightly very low down on THU's agenda.

The all-star line-up of speakers (called Knights in THU lingo) is a response to the tribe's wishlist and spans a diverse range of illustrators, 3D artists, make-up artists, designers, traditional artists, visual effects supervisors and more. Some of the many Knights this year included Iain McCaig, Kim Jung Gi, Paul Briggs, Kevin Mack, Alex Alvarez, Shane

This year's event was the third in Trojan Horse Was a Unicorn history and ran from 14 to 19 September

Mahan, Daisuke 'Dice' Tsutsumi and, top of the THU wishlist, the mighty Craig Mullins.

Leading illustrator Mullins took to the stage several times at THU, where he led a Q&A session covering questions such as advice and wisdom on how to avoid burnout and motivational issues, how to survive and prosper in production, coping with working freelance and being in isolation. And when he expressed his intent to move into teaching, he then asked what art schools should teach. "Everyone is struggling to raise their work level," Mullins mused, "I think of it like being under ice, drowning, and you're looking for that hole in the ice... It's either break out or die. Everyone feels the passage of days and there's so much to do, and only so much time to do it." He also joined THU ambassador Scott Ross for a fire-side chat discussing his career, held a technique demo where he drew live and chatted about his artistic decision-making along the way.

Iain McCaig, who also presented a couple of slots, focused on character design considerations for monsters and villains. He also looked at how 'good' characters can transition to 'evil' – such as Anakin Skywalker's downfall from Jedi to Sith – and how that transition is visually achieved in his 1001 Nightmares talk. The talk culminated with McCaig setting the tribe homework to design their own character based on a multiple choice brief, with the winners receiving a prize and feedback from McCaig on their work.

Sculptor in residence Shane Mahan discussed transferring traditional clay sculpts to digital and the challenges it posed. That was before inviting each tribe member to add a piece of clay to a one-side completed Frankenstein clay sculpt while he supervised. Daisuke 'Dice' Tsutsumi spoke about his career, from how he got started through to his reasons for leaving a comfortable life working as an art director at Pixar to follow his dreams.

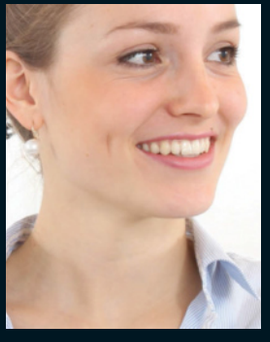
THU TV also launched this year, billed as the closest thing to being there at the event. Daily and full conference streaming passes were available, and the stream ran smoothly with only occasional audio problems where a mic wasn't close to the person speaking. Its purpose is threefold: to bring extra revenue, to keep the tight-knit small family feeling of the event and to cater for a global audience.

Despite the event's continued successes, the closing ceremony ended with the bombshell that there may be no THU next year, due to a lack of government and industry sponsorship.

Renderpeople introduces new wave of assets

Recognising that the creation of convincing humans is one of the most important components when it comes to the overall quality of architectural visualisation, Renderpeople has its sights firmly set on simplifying the digital workflow when using highly detailed 3D human models. And with an online library that currently provides over 200 commercially available hi-res 3D stock characters of photogrammetric scanned humans, the team is now directing its attention towards creating a new selection of assets with increased functionality for artists to deploy in their scenes.

This includes adding ready-rigged models to its existing ready-posed portfolio so that artists have the speed and flexibility to readjust a model's pose and create convincing shot integration based on the environment. Besides that, work is also developing on creating fully customisable texture solutions that will enable artists to have a larger range of flexibility to choose from within the library. Renderpeople is also looking to the needs within the field of arch-vis animation by developing a library of natural-looking and reasonably priced animated assets using its in-house mo-cap studio. In conjunction with these new directions, work is continuing on massively extending the ready-posed library with more than 10,000 RAW scans waiting to be processed.



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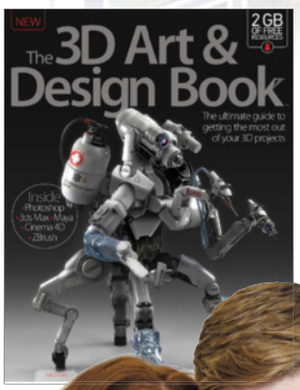

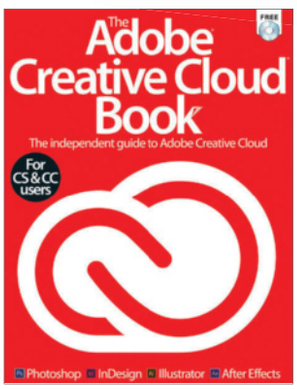
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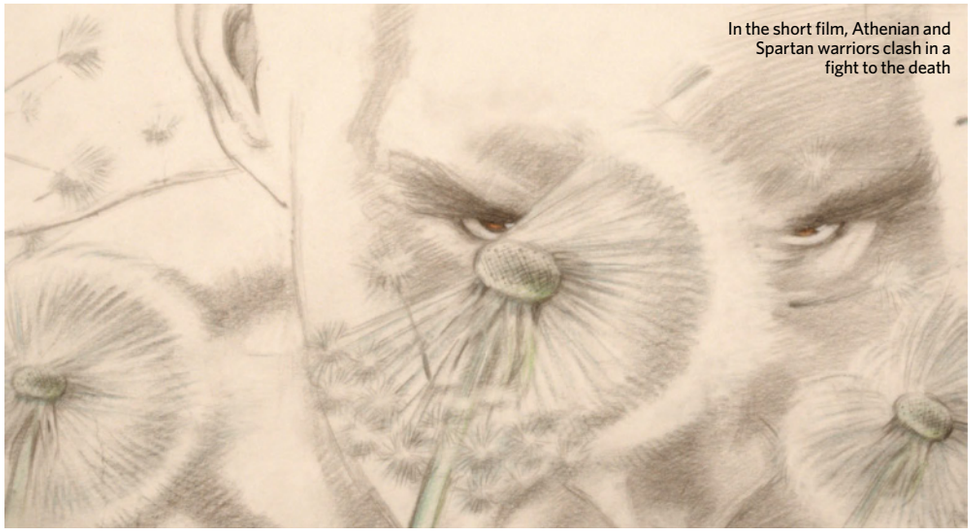


In the short film, Athenian and Spartan warriors clash in a fight to the death

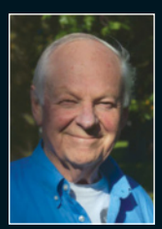
Richard Williams unveils 'Prologue'

'Prologue', the long awaited short film from animation maestro Richard Williams starts its Oscar qualifying run

As both a short film, in its own right, and also the first chapter of a larger film, 'Prologue' started its Academy Award qualifying run on 11 September. "We have just witnessed animation history", declared Peter Lord, co-founder of Aardman Studios, following the first screening of 'Prologue' in Summer 2015 – a project which Richard Williams has worked on for many years. "Nobody else alive could have created hand-drawn animation of this intensity and quality." Its six minutes describe an incident in the Spartan-Athenian wars of 2,400 years ago. A small girl is witness as warriors battle to the death. There is no dialogue, but instead natural sounds.

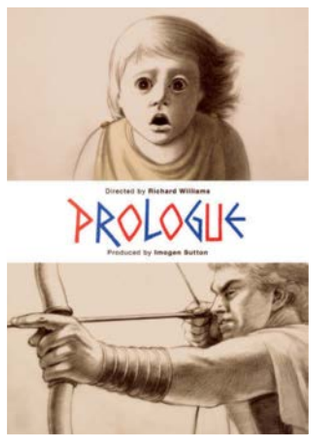
Drawing and animating the film alone, Williams has taken hand-drawn animation to a new level of expertise and impact. Breaking animation conventions, the film has an innovative mastery of movement and space, at the same time achieving dramatic and emotional intensity. Williams says, "I've gone back to [the year] 1900 and drawn each shot on a new sheet of paper. Then it's polished with state-of-the-art technology. It has taken over 6,000 complex animated life drawings to create this film." Each of them astonishes with old master precision.

The run took place between 11-17 September at Laemmle Royal, Los Angeles.



Richard Williams biography

Triple Oscar winner Richard Williams, has won over 250 awards including three BAFTAs and an Emmy. His films include *Who Framed Roger Rabbit*, *The Return Of The Pink Panther* and *A Christmas Carol*. With his international masterclasses, best-selling book *The Animator's Survival Kit*, 16-DVD box set and iPad app, he's trained many of today's top animators.



Prologue received its US premiere at Telluride Film Festival, Colorado

Unreal Engine 4.9 is released

Latest version is packed with updates for VR, DirectX 12 and more

Epic Games' newest iteration of Unreal Engine has some major highlights, including enhanced support for mobile platforms, bringing dynamic character shadows from directional lights, and dynamic point lights and decals. Many of the mobile features will apply to HTML5 games also. There are VR updates for the SteamVR plugin and for Gear VR as well, which is now updated to Mobile SDK 0.6.0. VR motion controller support is included for HTC Vive, with support for Playstation Move promised to be coming soon. You can add motion tracking to your project by adding a motion controller component to your character which automatically updates anything attached to it, to follow the position of your controllers. DirectX 12 support is offered as an experimental feature for Windows 10 users, bringing a much lower-level rendering API that is more efficient and enables rendering commands to be submitted in parallel across many threads. For a full list of this mammoth update, head over to the Unreal blog **unrealengine.com/blog/unreal-engine-49-released**.

The Lightmass ray tracer now supports area shadows for stationary lights

HAVE YOU HEARD? *Minions* **tops $1 billion USD worldwide, making it the third highest-grossing animated movie of all time**

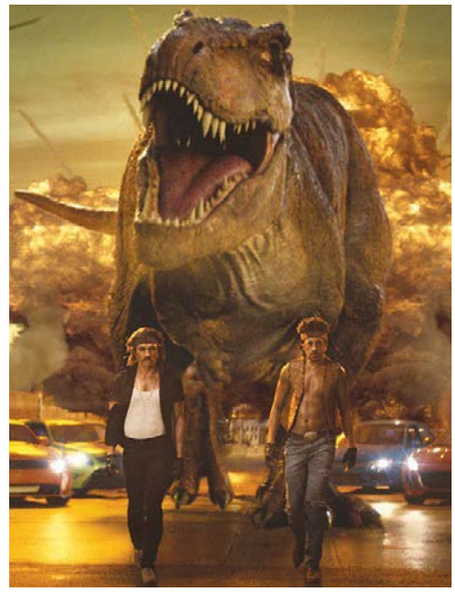
Sensel Morph sets up Kickstarter

Next-gen multitouch pressure-sensitive input device seeks to outperform existing solutions

Sensel Morph is a new kind of touch user interface, designed to supersede the traditional keyboard, mouse devices and more current technology such as Apple's Force Touch trackpad. Crammed with over 20,000 sensors, it's capable of detecting a very broad range of objects, movements and pressures, ranging from the soft touch of a paintbrush to the firm hit of drumsticks.

Optional magnetic overlays are also available such as QWERTY keyboard, MIDI controller, piano keys, DJ layout, game controller and a drum pad. Customisable innovator overlays enable users to create their own custom interfaces. It's battery powered and connects via USB, Bluetooth or developer cables. Find out more about the Sensel Morph or make a pledge at kck.st/1JktNd4.

Morph promises to be versatile enough to function as any kind of input device you desire



MPC LA completed VFX and colour for EA Sports' 'Madden: The Movie', from agency HEAT San Francisco, directed by Hungry Man's Wayne McClammy

Raylight Games launch EasySkin

New 3ds Max plugin EasySkin aims to make skinning characters for animation a lot faster

Italian videogames developer, Raylight Games, has released a new 3ds Max plugin called EasySkin. It offers a reorganised interface that prioritises the most useful skin modifier tools for vastly improved workflow efficiency. Spheroidal envelopes created using the Bubble System provide a smoother final result between joint weights. Other notable EasySkin for 3ds Max features include fast Mirroring tools, simplified Paint Weights tools and integrated Vertex Weight Ttools. EasySkin is available now for 3ds Max 2009 and up (32 and 64-bit) and is priced at €19.99.

A time-lapse video showing EasySkin in action is available on **raylightgames.com**

MPC LA relocates

The Los Angeles studios announces relocation to Culver City and production team expansion

MPC's Los Angeles team will relocate from Santa Monica to a bespoke space in Culver City in early 2016. A former book-binding factory remodelled by architect Bruce Bolander is destined to be the new home for its LA advertising activities and expand their film preproduction team. Global MD MPC Advertising Graham Bird explained: "It's the right time for MPC to change its location and expand the team in LA. These changes will reflect the needs of our business, which today sees us partnering [with] clients on VFX and experiential projects as well as wide-ranging innovative creative technologies, such as VR and AR."

Software shorts

Bringing you the lowdown on product updates and launches

Krita 2.9.7 Donation-funded sketching and painting software, Krita, boasts a stack of new features and over 150 bug fixes. Updates include: OpenEXR 2.2 for Windows versions, Tangent Normal Brush Engine, new resizable icons, Color Space selector, updates to the Wraparound node and improved compatibility with GIMP. It's available on Linux, Windows and OS X at **krita.org**.

Superpose By analysing every pixel of every frame, Superpose for NUKE 8 and 9 offers a powerful solution to the time-consuming and frequently patience-testing task of removing moving objects such as snow, rain, crowds and traffic from a set of images or image sequence with a static or stabilised camera. For more information, check out **keller.io/superpose**.

Fusion 8 Beta The new Fusion 8 Beta is available to download on Windows and, for the first time, OS X from the Blackmagic Design website. It's a fully featured node-based compositor and motion graphics application that supports GPU acceleration, and the ability to import and render 3D models and scenes from a range of applications. Read more at **blackmagicdesign.com**.

DID YOU KNOW? Autodesk have added MASH, a procedural animation toolkit for Maya, to its product portfolio

Elastic

The studio explains how it used V-Ray and other tools for the title sequence of Marvel's Daredevil

Description Animation and design studio Elastic offers its services to television, feature film, immersive digital and commercial production.

Website elastic.tv

Location USA

Project *Daredevil*

Client DeKnight Productions, Goddard Textiles, ABC Studios, Marvel Television, Netflix

Software ZBrush, Maya, RealFlow, V-Ray for Maya, NUKE

Contributors Jennifer Sofio Hall (EP of Elastic), Andrew Romatz (CG supervisor for the *Daredevil* main titles), Patrick Clair (director), Kirk Shintani (head of 3D)

Portfolio Highlights

2015 *True Detective (Season 2)*

2015 *Call Of Duty: Black Ops trailer*

2014 *Game Of Thrones: The Sight*

© 2014 VFX by a52 / Elastic

If less is more then capturing the spirit of a character, and the world they inhabit, in an opening-title sequence epitomises that creative challenge. Of Elastic's contributions to a number of recent pop culture hits, Jennifer Sofio Hall explains: "Talent is the core of our business at Elastic. As artists at our sister companies, a52 and Rock Paper Scissors, founding members Angus Wall, Andy Hall and Patrick Murphy had the desire to work directly with clients and brands and develop creative in collaboration with them. Working collaboratively allows the creative to never be boxed in by an executional tool."

Kirk Shintani adds: "I can say that everything has been artistically rewarding. How often can you say that? Any time we have a chance to take on a project like [*Daredevil*], it's so much fun. It's all about the visuals. Strong visuals convey meaning and give the audience an idea of what they can expect from characters, story and tone." Patrick Clair develops the insight further: "The challenge of a main title is really finding visual and symbolic ways to capture the tone, characters and world of the show. The best title sequences seem to come when the production team take the time to really help us understand their vision for the world, then we can craft a sequence unique to the story they are telling."

Of the *Daredevil* story, Patrick Clair recalls: "What struck me was the insidious corruption creeping into Hell's Kitchen through the rebuilding process following the events of *Avengers Assemble*. This seemed like a strong theme to tap into, but I was also thinking about justice, symbolism of blind justice, the detail of New York streets and the origin of *Daredevil* in the poisonous radioactive goop."

Detailing the use of particular software Andrew Romatz explains: "ZBrush was key for getting the level of detail we were looking for in our sculptures. In RealFlow we used directable velocity and custom attractor fields to get the sims to flow exactly where we needed them to. We used 3D projections in Maya to layer up fluid elements on top of the sim meshes to get the feel we were looking for." Kirk adds: "RealFlow allowed us to get the viscosity that we wanted, which was very important. For rendering, V-Ray allowed us to render some seriously dense meshes and still gave us the control we needed to iterate quickly. V-Ray 3.0 was fast and stable, and rendering was never an issue, which speaks to the strength of the software."

For the creation of the main title's stunning wax-like effects Andrew identifies how Elastic did it: "We did all of our look development in Maya and V-Ray with the reference for the fluid surface being something like a mixture of blood, poison and red paint. At the same time we were doing look development, the FX artists were setting up fluid simulations for the dripping fluid. Once we had the fluid simulation, colour and lighting where we wanted them, we sent renders into NUKE to be comped together and cleaned up [with] the final look applied."

As our conversation concludes we ask what advice Elastic has for aspiring artists. Jennifer Sofio Hall is quick to answer: "Story is what drives connections with people... If there's a great story at the heart of a piece, then you can usually make it look amazing with the help of other talented people."

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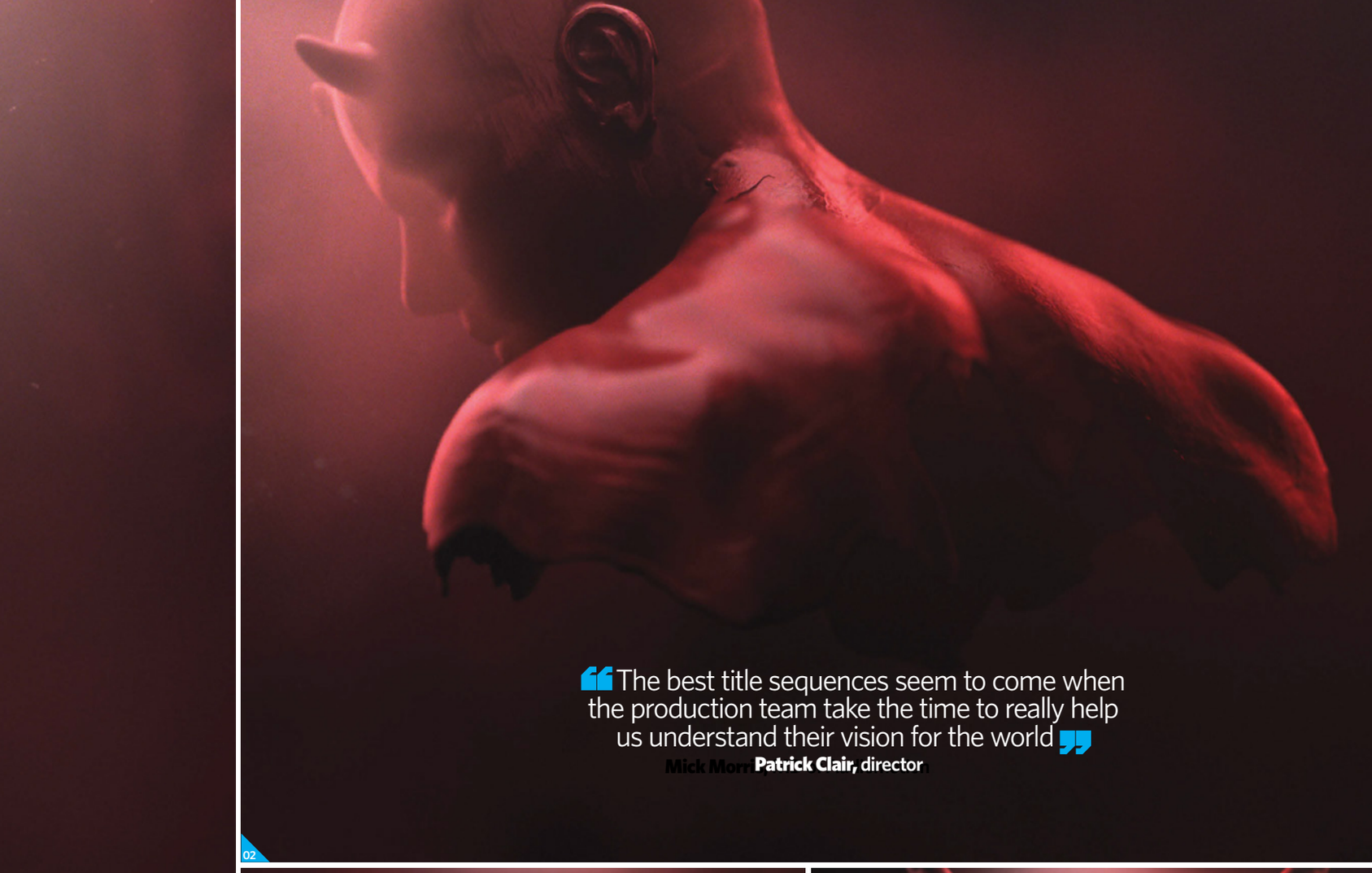
“The best title sequences seem to come when the production team take the time to really help us understand their vision for the world”
Patrick Clair, director

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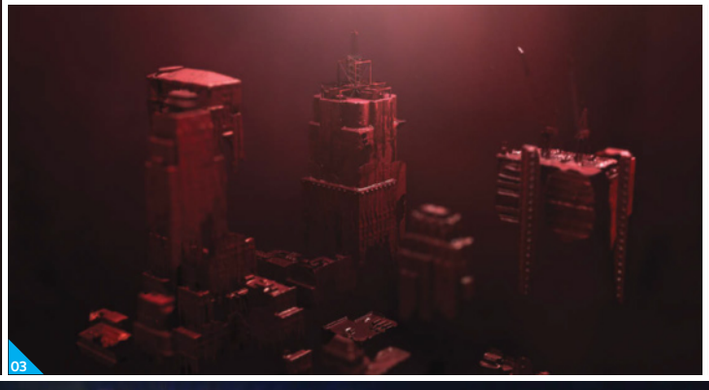

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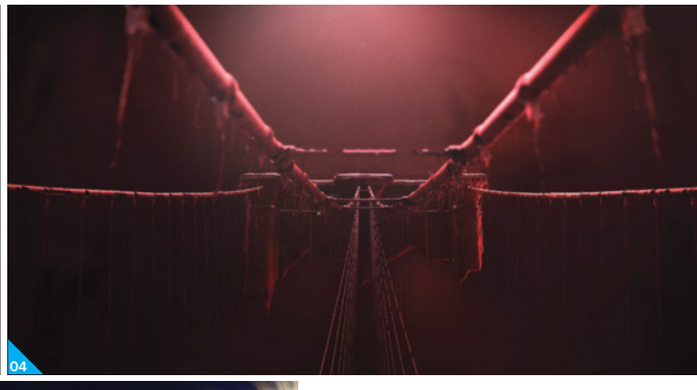

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01 The brooding main titles emphasise the theme of justice: a message that is essential to the world of *Daredevil*

02 The design statement concludes with a final image of *Daredevil* and his horns

03 V-Ray 3.0 proved an efficient rendering tool for Elastic

04 ZBrush was essential to the detailing of sculptures seen in the main title

05 Director Patrick Clair also worked on the title sequences for *True Detective*

06 Elastic is based in Santa Monica along with its sister companies a52 and Rock Paper Scissors

Images of the month

These are the 3D projects that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

01 Sunshine after the rain
by Ronnie Aerts
3DA username
R. Aerts
Ronnie says: "This started as a simple project of a lightbulb. It ended with modelling a lot of objects in high detail."
We say: *We love this image, both from a conceptual standpoint and a technical one too. The wonderful blend of colours is a highlight and we think that the detail in the lower half of the bulb is impressive.*

02 Samurai Honor
by Brad Gibson
3DA username
scratchdaddy
Brad says: "I sculpted the skull from a sphere using DynaMesh and made the helmet with ZModeler. Then, ZRemesher was used for clean topology and the details projected. KeyShot was used for the render."
We say: *Brad has done a great job with his samurai image, paying close attention to adding wear and tear to the skull and the helmet.*

03 Brika Towers
by Arash Fattahi
3DA username
mahone
Arash says: "In this render I tried to create a street scene with towers after rain with the Sun showing. I think this effect is very favourable."
We say: *We think that the effect that Arash has created here is simply superb – it really possesses that hazy quality that everything has as the Sun breaks through the clouds after a nasty downpour.*

04 Grey Room
by Tarek Youssef Gerges
3DA username
Tarekgerges
Tarek says: "I made a goal to achieve the most realistic result I have ever achieved. Grey Room took 48 hours to complete and 24 to render. The textures were picked carefully to match the lighting."
We say: *This is a lovely scene, combining crisp, clean curves that form the lamp at the rear with a coarse texture for the walls.*

03

04

Prehistoric Whale **by Jakub Wydro**

3DA username jakubwydro

Jakub says: "I adore creating fantasy work as I can release my imagination and get carried away creatively. There are no set rules so everything is possible."

We say: *This is a fantastic composition, with particular highlights being the particle effects in the bottom right and the awesome texturing job Jakub has done on the whales.*

Scout **by Stefan Misirdzhiev**

3DA username Chesher

Stefan says: "I decided to try and make something more stealthy looking for this one, while trying out some new techniques. Apart from the helmet this is also my first go at making my own digital set, with the background being made using World Machine and Terragen."

We say: *Stefan has demonstrated a good understanding of sci-fi imagery with this scene and has achieved loads of variety in his scout's armour.*

Place for Reading **by Victor Serdobintsev**

3DA username godmaker

Victor says: "I wanted to play with light and create a homely atmosphere – a quiet, cozy corner."

We say: *Victor has created exactly what he set out to – a quiet, cozy atmosphere. We love how the light bounces off the bookshelf and has created shadow towards the top of the scene.*

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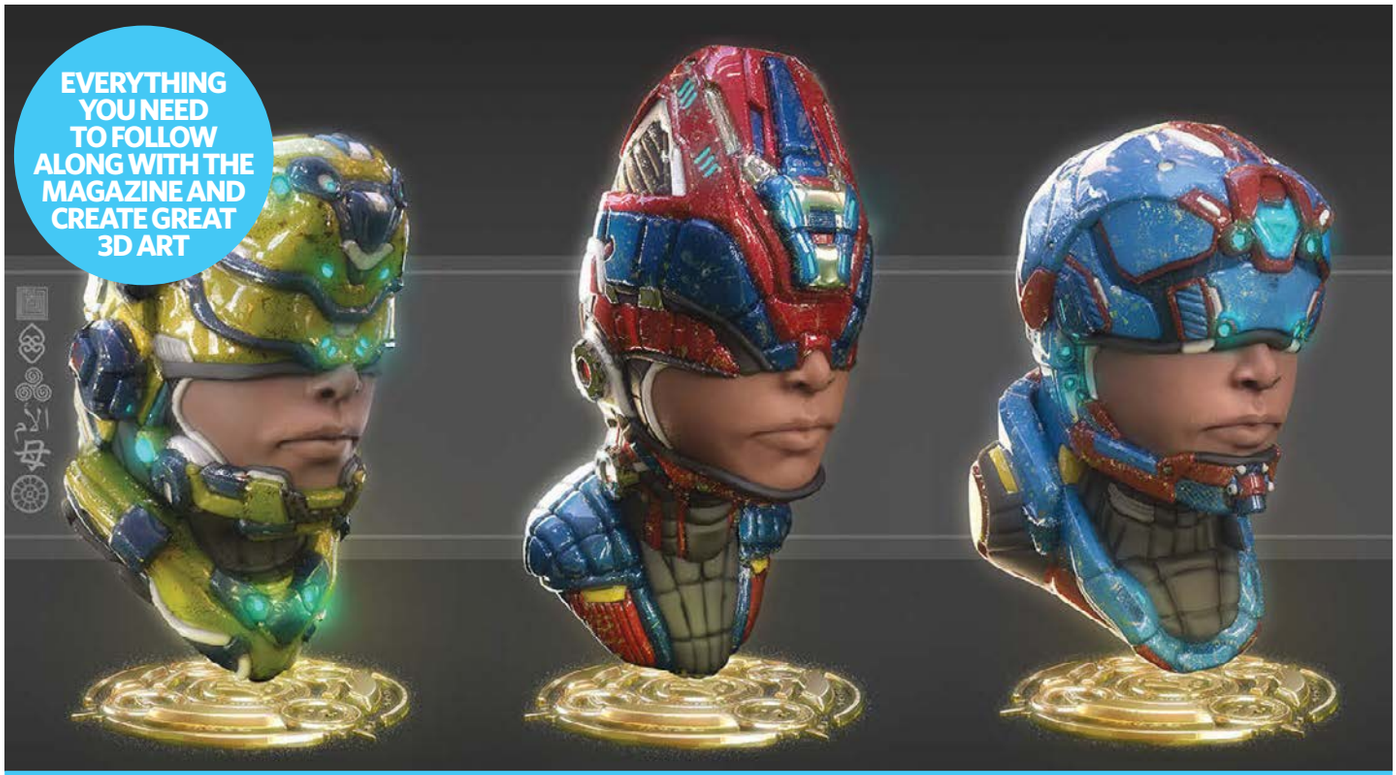

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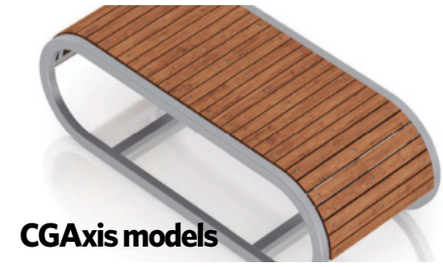

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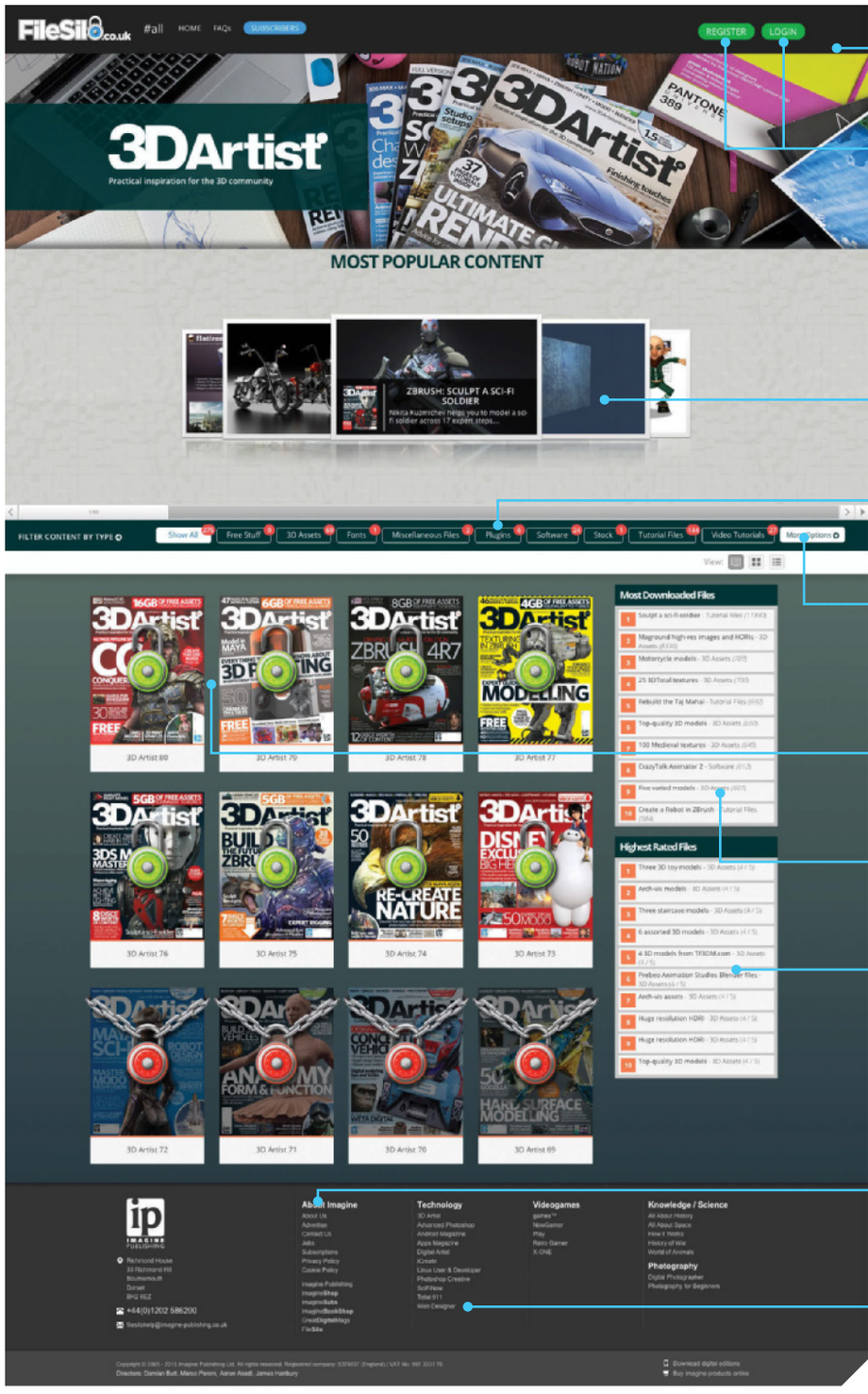

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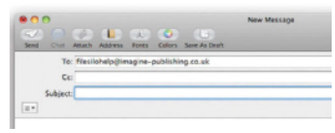

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Having trouble with any of the techniques in this issue's tutorials? Don't know how to make the best use of your free resources? Want to have your work critiqued by those in the know? Then why not visit the **3D Artist** Facebook page for all your questions, concerns and qualms? There is a friendly community of fellow 3D artists to help you out, as well as regular posts and updates from the magazine team. Like us today and start chatting!

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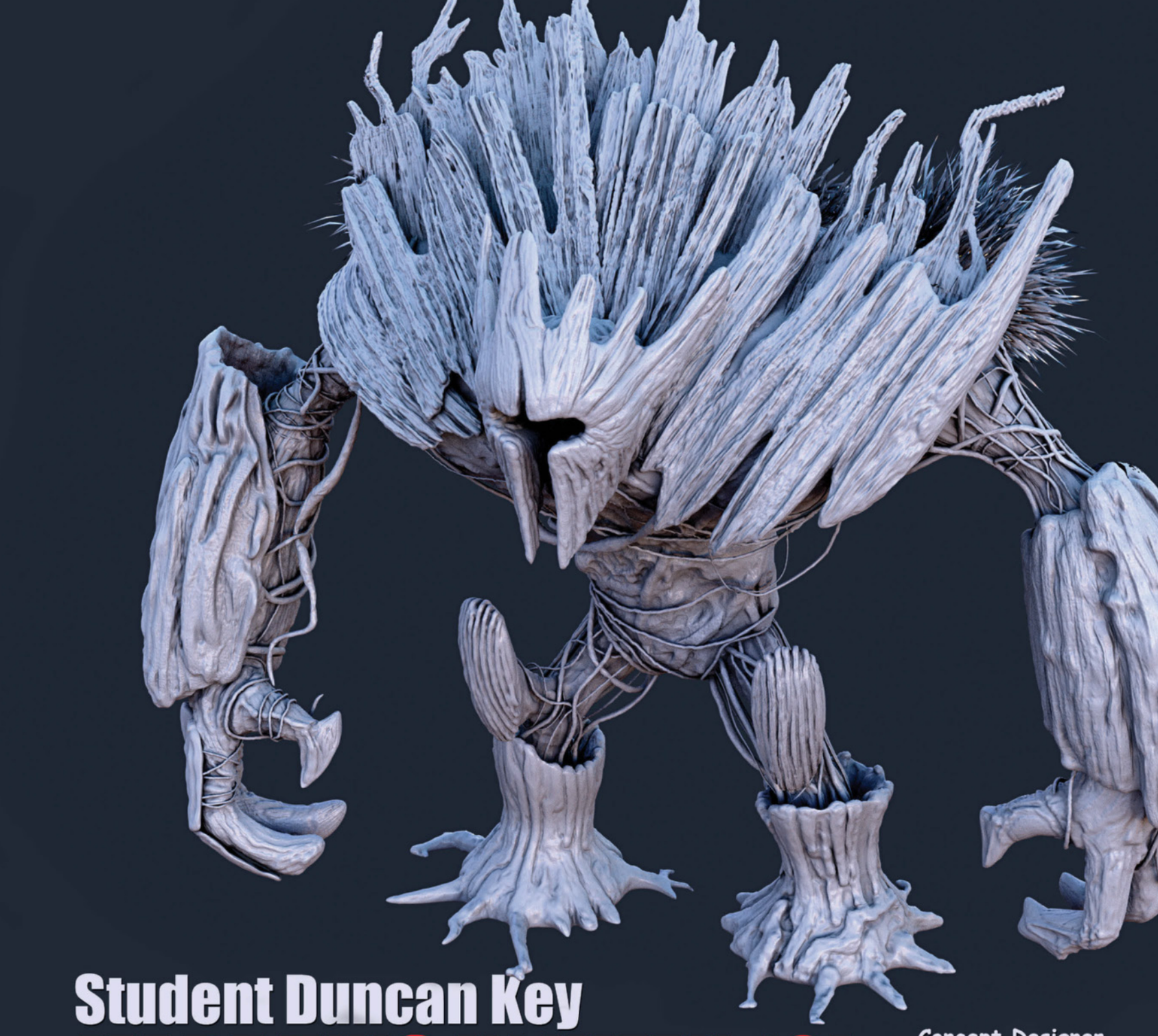

Student Duncan Key
MADE THIS IN WEEK 10!

Concept Designer
Grant Gosler

We're not sure which is cooler, the fact that Duncan made this in the 10th week of DAVE School (with no prior training) or the fact that this was the second ZBrush project assigned to his class! Our students benefit from being assigned carefully planned projects with expert instruction so they are doing amazing work right out of the gate!

They are provided with world-class designs from notable concept artists and shown professional techniques, but how they use their newly acquired skills is entirely up to them. The DAVE School never provides step-by-step instruction, we push the student to find their own way through a challenge, just like they will when they go to work at a studio.

And while we are proud of Duncan, he's by no means the only one. Check out our student galleries and you will see page after page of consistently great work from a wide variety of students! Our modeling program is common to both our 12-month **VFX Production** program and our 15-month course in **Game Production.**

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